

DATE: January 8, 2016

SUBJECT: Radiochemical Data Validation for Niagara Falls Boulevard Site, Niagara Falls, Niagara County, New York. Test America data packages 160-13352-2, 160-13352-1, and 160-13352-3.

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1. Overview

This report addresses three data packages that were analyzed by TestAmerica Laboratories, of St. Louis, MO. The package numbers were 160-13352-2, 160-13352-1, and 160-13352-3. The analytes (isotopes) and methods are provided in the following table.

Table of Isotopes and Analytical Methods.

Test America Method	Similar Standard Method	Description	Analyte
9315	SW-846 Method 9315	Separation and Gas Flow Proportional Counting (Alpha)	Radium-226
9320	SW-846 Method 9320	Separation and Gas Flow Proportional Counting (Beta)	Radium-228
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Thorium-228
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Thorium-230
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Thorium-232
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Uranium-233/234
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Uranium-235/236
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Uranium-238
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Ac-228
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Bi-212
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Bi-214
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Cesium-137
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	K-40
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Pb-212
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Pb-214

Test America Method	Similar Standard Method	Description	Analyte
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Radium-226
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Radium-228
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Tl-208

2. INTRODUCTION

Two (2) water sample and eighteen (18) soil samples were collected during the time period August 11 and August 19, 2015. The following table provides a list of these field samples. The data were delivered in three packages. Each package included a summary report, chain of custody, case narrative, and raw data. An electronic data deliverables (EDD) was provided, which contained some, but not all, raw data and results in a readily accessible format.

The radio-analytical data were validated to Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) *Chapter 8 - Radiochemical Data Verification and Validation*¹ and the requirements of the quality assurance project plan (QAPP).² The depth of the validation was necessarily limited because Derived Concentration Guidelines (DCGL), and some specific data performance requirements have not been designated.

DATA VALIDATION PRECAUTIONS AND LIMITATIONS

It should be noted that this technical report describes method validation and is not intended to provide guidance for validation of overall program/project objectives and requirements. Project validation is generally performed by project management personnel and involves a comprehensive review of all aspects (and objectives) of a sampling and analysis project.

Table of Sample IDs and Analytical Methods. .

Query38			
CLIENT_SAMPLE_DESCRIPTION	LAB_SAMPLE_ID	MATRIX	ANALYSIS_METHOD
N001-SS001-1224-01	160-13352-1	SO	A-01-R
N001-SS001-1224-01	160-13352-1	SO	GA-01-R
N001-SS001-1224-01	160-13352-1 DU	SO	GA-01-R
N001-SS002-1224-01	160-13352-2	SO	A-01-R
N001-SS002-1224-01	160-13352-2	SO	GA-01-R
N001-SS003-0012-01	160-13352-3	SO	A-01-R
N001-SS003-0012-01	160-13352-3	SO	GA-01-R
N001-SS004-0012-01	160-13352-4	SO	A-01-R
N001-SS004-0012-01	160-13352-4	SO	GA-01-R
N001-SS005-1830-01	160-13352-5	SO	A-01-R
N001-SS005-1830-01	160-13352-5	SO	GA-01-R

¹ Multi-Agency Radiological Laboratory Analytical Protocols Manual, Volume I, NUREG-1576, EPA 402-B-04-001A, NTIS PB2004-105421, July 2004.

² SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN, NIAGARA FALLS BOULEVARD SITE NIAGARA FALLS, NIAGARA COUNTY, NEW YORK. DCN: RST3-02-D-0033. August 2015.

Query38			
CLIENT_SAMPLE_DESCRIPTION	LAB_SAMPLE_ID	MATRIX	ANALYSIS_METHOD
N001-SS006-0012-01	160-13352-6	SO	A-01-R
N001-SS006-0012-01	160-13352-6	SO	GA-01-R
N001-SS007-0012-01	160-13352-7	SO	A-01-R
N001-SS007-0012-01	160-13352-7	SO	GA-01-R
N002-SS001-0012-01	160-13352-8	SO	A-01-R
N002-SS001-0012-01	160-13352-8	SO	GA-01-R
N002-SS002-0012-01	160-13352-9	SO	A-01-R
N002-SS002-0012-01	160-13352-9	SO	GA-01-R
N002-SS003-0012-01	160-13352-10	SO	A-01-R
N002-SS003-0012-01	160-13352-10	SO	GA-01-R
N002-SS004-0012-01	160-13352-11	SO	A-01-R
N002-SS004-0012-01	160-13352-11	SO	GA-01-R
N002-SS005-0012-01	160-13352-12	SO	A-01-R
N002-SS005-0012-01	160-13352-12	SO	GA-01-R
N002-SS006-2436-01	160-13352-13	SO	A-01-R
N002-SS006-2436-01	160-13352-13	SO	GA-01-R
N002-TRENCH-0003-01	160-13352-14	SO	A-01-R
N002-TRENCH-0003-01	160-13352-14	SO	GA-01-R
N003-SS001-1022-01	160-13352-15	SO	A-01-R
N003-SS001-1022-01	160-13352-15	SO	GA-01-R
N003-SS002-2436-01	160-13352-16	SO	A-01-R
N003-SS002-2436-01	160-13352-16	SO	GA-01-R
N003-SS003-1224-01	160-13352-17	SO	A-01-R
N003-SS003-1224-01	160-13352-17	SO	GA-01-R
N003-SS003-1224-02	160-13352-18	SO	A-01-R
N003-SS003-1224-02	160-13352-18	SO	GA-01-R
RB-N-150811	160-13352-19	LI	9315
RB-N-150811	160-13352-19	LI	9320
RB-N-150811	160-13352-19	LI	A-01-R
RB-N-150811	160-13352-19	LI	GA-01-R
RB-N-150812	160-13352-20	LI	9315
RB-N-150812	160-13352-20 DU	LI	9315
RB-N-150812	160-13352-20	LI	9320
RB-N-150812	160-13352-20 DU	LI	9320
RB-N-150812	160-13352-20	LI	A-01-R
RB-N-150812	160-13352-20	LI	GA-01-R

3. DATA QUALIFIERS

Final Data qualifiers are codes placed on an analytical result that alert data users to the validator's concern about the result. These qualifiers may be summarized as U, J, R, or Q in the final validation report.

None the analysis was performed and radioactivity was detected. The result is statistically positive at the 95% confidence level, above the critical level and above the MDC. The radionuclide is considered to be present in the sample.

U A normal, not detected (< critical value) result.

UJ The analyte was not detected, but the required MDA was not attained. A number of specific problems also resulted in assignment of a J qualifier where results were more uncertain than usual.

Q A reported combined standard uncertainty, which exceeds the project's required method uncertainty. (In this report Q was only used as an intermediate or preliminary qualifier.)

J An unusually uncertain or estimated result.

R A rejected result: the problems (quantitative or qualitative) are so severe that the data cannot be used.

The data validator should be aware that a data qualifier or a set of qualifiers does not apply to all similar data. The data validator should incorporate the project MQOs into the testing and qualifying decision-making process.

During the data validation process the data validator may use additional qualifiers based on QC sample results and acceptance criteria. The final validation reports should also include a summary of QC sample performance for use by the data assessor. Intermediate or preliminary qualifiers, such as 'S', 'B' or 'P' are assigned on the basis of QC sample performance and these are taken into consideration in assignment of a final qualifier to an analytical result.

S A result with a related spike result (laboratory control sample [LCS], matrix spike [MS] or matrix spike duplicate [MSD]) that is outside the control limit for recovery (%R); S+ or S- used to indicate high or low recovery.

P A result with an associated replicate result that exceeds the control limit.

B A result with associated blank result, which is outside the control limit, B+ or B-.used to indicate high or low results.

The logic for mapping preliminary data qualifiers to final data qualifiers is provided in the following table. Each sample result has only one final data qualifier, but may have several preliminary or intermediate data qualifiers.

4. Equations

The following equations are frequently used to compare the performance of pairs of aliquots that were drawn from the same sample.

A. **Duplicate error ratio**

The duplicate error ratio is the relative error in a pair of measurements and takes into account the measurement results, Ma and Mb, as well as the standard errors associated with the measurements, 2Sa and 2Sb.

By convention, laboratories report analytical errors as 2 times the standard deviation, 2Sa and 2 Sb. If Ma and Mb are results from duplicate aliquots that were taken from a homogeneous sample, then ninety-five percent of the time, the DER is expected to be less than 1.96. Ninety-nine percent of the time it is expected to be less than 2.58.

$$DER = 2 \times \frac{Abs(Ma - Mb)}{\sqrt{(2 Sa)^2 + (2 Sb)^2}}$$

B. Relative Percent Difference

The relative percent difference (RPctD) is a measure of consistency of measured concentration between two aliquots of a sample.

$$RPctD = 200\% \times \frac{Abs(Ma - Mb)}{Ma + Mb}$$

Table of preliminary and final data qualifiers for this dataset.

Preliminary Data Qualifiers	Final Data Qualifier
B+,	
J,	J
J+, B+,	J+
J+, B+, J,	J+
J+, B+, Q, U	U
P,	J
P, J,	J
P, J+,	J+
P, J+, J,	J+
P, J+, Q, U	U
P, Q, J,	J
P, Q, U	U
Q, U	U
R,	R

5. SAMPLE HANDLING AND ANALYSIS EVALUATION

This section contains the technical review comments describing the findings and observations for each of the main verification and validation parameters described in MARLAP Chapter 8 - Radiochemical Data Verification and Validation.

C. Sample Descriptors (MARLAP 8.5.1.1)

Each sample should have a unique identification code that can be cross-referenced to a unique laboratory identification number.

Discussion

The laboratory identification numbers were correctly listed in the cover page/case narrative in the data package. No issues of this type were recognized and no qualifiers were assigned on this basis.

D. Aliquot Size (MARLAP 8.5.1.2)

The aliquot or sample size used for analysis should be documented so that it can be checked when reviewing calculations, examining dilution factors or analyzing any data that requires aliquot as an input. It is also imperative that the appropriate unit (liter, kilogram, etc.) is assigned to the aliquot.

Discussion

Each sample in the data package had an aliquot size associated with each result. No issues of this type were recognized and no qualifiers were assigned on this basis.

E. Dates of Sample Collection, Preparation, and Analysis (MARLAP 8.5.1.3)

The analytical data package should report date of sampling, preparation, and analysis. These data are used to calculate radiological holding times, some of which may be specified in the Field Sampling Plan.

Discussion

Data were provided and the holding time requirements (i.e. <6 months) were met for every analysis in the data package. No issues of this type were recognized and no qualifiers were assigned on this basis.

F. Preservation (MARLAP 8.5.1.4)

Appropriate preservation is dependent upon analyte and matrix and should be defined in sampling and analysis documentation.

Discussion

The last page of each data package is the “Login Sample Receipt Checklist,” which describes the preservation state of samples. The lab reported that all samples were acceptably preserved by temperature of acidification.

No issues of this type were noted and no sample results were assigned qualifiers on this basis.

G. Tracking (MARLAP 8.5.1.5)

Each analytical result should be linked to the instrument or detector on which it was counted.

Discussion

Each analytical result in the data package was linked to a specific detector. Thus no issues of this type were recognized and no qualifiers were assigned on this basis.

H. Traceability (MARLAP 8.5.1.6)

The traceability of standards and reference materials to be used during the analysis should be specified in the Field Sampling Plan.

Discussion

The Field Sampling Plan did not provide specific requirements for traceability. However, there is documentation that all radioactive standards are directly or indirectly traceable to NIST. No qualifiers were assigned on this basis.

I. QC Types and Linkages (MARLAP 8.5.1.7)

The type and quantity of QC samples should be identified and listed in the SOW and the results provided by the laboratory in a summary report. Replicates and matrix spike results should be linked to the original sample results.

The information obtained from the analysis of laboratory generated duplicates is useful to evaluate analytical variability and laboratory precision. Results from the analysis of laboratory generated duplicate samples can also reflect the homogeneity or inhomogeneity of individual samples or groups of samples of the same matrices.

Discussion

There is one laboratory replicate pair for each analyte. In addition, results for method blanks, and a laboratory control standard were supplied for each analyte. Matrix spikes or matrix spike duplicates were not required by the Field Sampling Plan. For each analyte there is a pair of field duplicates and a rinse blank. The QC types are clearly linked to the analytes and methods. Field replicates are clearly linked to analytes and methods. No qualifiers were assigned on this basis.

J. Chemical Separation (Yield) (MARLAP 8.5.1.8)

Yield assesses the effects of the sample matrix and the chemical separation steps on the analytical result and estimates the analyte loss throughout the total analytical process.

The evaluation of an analytical yield serves to evaluate the efficiency of radiochemical separations utilized when preparing samples for measurement or analysis. The use of a tracer is conducted when a known amount of a chemical tracer is added to unknown samples; during analysis, a yield or recovery of the tracer material is used to determine the efficiency of the entire analytical process. The tracer that is chosen is used because it mimics the properties of one or more target radionuclides. A tracer refers to a radioactive isotope, while a carrier is a non-radioactive substance.

Discussion

The analyses that employed a tracer or carrier include:

- Radium-226 and radium-228 by gas flow proportional counting. The carriers employed were stable barium and yttrium.
- Isotopic thorium by alpha spectroscopy (thorium-229 tracer),
- Isotopic uranium by alpha spectroscopy (uranium-232 tracer).

All samples exhibited an acceptable tracer recovery. Thus no issues of this type were recognized and no qualifiers were assigned on this basis.

K. Self-Absorption (MARLAP 8.5.1.9)

For some radiochemical analytical methods, the SOW may specify the generation of a self-absorption curve, which correlates mass of sample deposited in a known geometry to detector efficiency.

Discussion

The laboratory employed self-absorption corrections in determination of radium-226 and radium-228 by gas flow proportional counting (GFPC). Mass absorption curves are provided on pages 731 and 732 of the Level 4 package report J13352-2.

No qualifiers were assigned on this basis.

L. Efficiency, Calibration Curves, and Instrument Background (MARLAP 8.5.1.10)

The determination of detector efficiency is a detailed process that is best checked during an audit of the laboratory's capabilities and is usually not part of the verification and validation process.

Discussion

Efficiency -Efficiency and self-absorption are accounted for with GFPC by a correction curve, which was addressed in the "Self-Absorption" section, above. Efficiency and energy calibration were checked daily, monthly and annually for alpha and gamma spectrometers.

Backgrounds – Daily, monthly and annual backgrounds are provided for alpha and gamma spectrometers as well as GFPC units. Energy calibration and background was determined daily for gamma spectrometers.

The background and detector response histories are well documented in the data packages. No issues of these types were recognized and no qualifiers were assigned on this basis.

M. Spectrometry Resolution (MARLAP 8.5.1.11)

The measured resolution of alpha and gamma spectrometers, and spectral information should be provided in the data package to evaluate if proper peak identification and separation was made.

Discussion

FWHM data are provided for the alpha spectroscopy results. There are no established acceptance criteria for alpha spectrometer resolution in the QAPP. Energy resolution was sufficient to allow resolution of the alpha emitting thorium or uranium isotopes of interest. The individual alpha spectra for samples and standards are provided.

FWHM data for gamma spectroscopy results are within 0.5%, which meets the requirements of the QAPP.

No issues with missing spectra or spectral resolution were recognized and no qualifiers were assigned on this basis.

N. Dilution and Correction Factors (MARLAP 8.5.1.12)

Samples for radiochemistry are usually not diluted. If required, dilution and correction factors (i.e., dry weight correction, ashed weight correction) should be provided in the data package so that the final calculations of all data affected by dilution factors can be recalculated and confirmed.

Discussion

Dilutions of the standard solutions are addressed in section V of the data package. Dilution factors are given for tritium samples. Aliquot sizes, wet weights and dry weights are provided in the data package for each sample and analyte. No issues with these factors were recognized and no qualifiers were assigned on this basis.

O. Counts and Count Time (Duration) (MARLAP 8.5.1.13)

The count time for each sample, QC analysis, and instrument background should be recorded in the data package. The ability to detect radionuclides is directly related to the count time.

Discussion

Count times, QC analyses, and backgrounds are documented in the data package. Count times were nearly always sufficient for results to have the required MDC. No issues with missing data of these types were recognized.

P. Result of Measurement, Uncertainty, Minimum Detectable Concentration, and Units (MARLAP 8.5.1.14)

The result of each measurement, its expanded measurement uncertainty, and the estimated sample- or analyte-specific MDC should be reported for each sample in the appropriate units.

Discussion

No issues with these factors were recognized and no qualifiers were assigned on this basis.

6. QUALITY CONTROL SAMPLES TECHNICAL REVIEW

A. Method Blanks (MARLAP 8.5.2.1)

The requirement for a method blank is usually established in the SOW and appropriate plan documents. Check to see if a method blank was analyzed and no detected concentration/activity found in the results.

Discussion

Method blank results were provided for every analyte in the data package.

Activity was detected in method blanks for soil and liquid as noted below. An intermediate qualifier value of 'J' means that the analyte was detected above the critical level in the method blank. If no intermediate qualifier value is provided for a method blank, then the analyte of interest was detected above the minimum detectable concentration.

Table of method blanks having detected activity.

LAB_SAMPLE_ID	MATRIX	METHOD	ISOTOPE	CONC	UNITS	INTERMEDIATE QUALIFIERS
MB 160-206002/1-A	SO	A-01-R	Thorium-230	0.11	pCi/g	
MB 160-206002/1-A	SO	A-01-R	Thorium-228	0.06	pCi/g	
MB 160-206043/1-A	LI	A-01-R	Thorium-230	0.14	pCi/L	
MB 160-206049/1-A	LI	9315	Radium-226	0.05	pCi/L	J
MB 160-206252/1-A	SO	A-01-R	Uranium-233/234	0.03	pCi/g	J
MB 160-206252/1-A	SO	A-01-R	Uranium-238	0.03	pCi/g	

B. Laboratory Control Samples (MARLAP 8.5.2.2)

LCS samples were run for each batch and analysis type, and all spike and recovery results for LCS samples were acceptable.

Laboratory control sample replicates of alpha spectroscopy samples showed acceptable performance as indicated below.

Table summarizing laboratory control standard performance.

LCSD					
LCS Dup ID	LCS ID	Matrix	Isotope	Relative % Difference	Duplicate Error Ratio
LCSD 160-206043/3-A	LCS 160-206043/2-A	LI	Thorium-230	3	0.34
LCSD 160-206044/3-A	LCS 160-206044/2-A	LI	Uranium-233/234	11	1.32
LCSD 160-206044/3-A	LCS 160-206044/2-A	LI	Uranium-235/236	14	0.48
LCSD 160-206044/3-A	LCS 160-206044/2-A	LI	Uranium-238	2	0.26

No issues of this type with Laboratory Control Samples were recognized and no qualifiers were assigned on this basis.

C. **Laboratory Replicates (MARLAP 8.5.2.3)**

The objective of replicate analyses is to measure laboratory precision based on each sample matrix. Check to see if laboratory replicate was analyzed and within control limits.

Discussion

Lab replicates exhibited a high relative percent difference (RPctD) for cesium-137 and radium-226 by method GA-01-R. This affected only gamma spectroscopy samples that had the prompt count with only 3 days of ingrowth between sample propagation and sample counting. The samples that were associated with these two replicate pairs were assigned a qualifier of 'P'.

The radium-226 and 228 results by methods 9320 and 9315 were non-detects and associated samples were not assigned P qualifier because the concentrations in the replicates were sufficiently low that the RPctD was not meaningful.

Table summarizing laboratory replicate performance.

Client Sample ID	N001-SS001-1224-01	N001-SS001-1224-01	RB-N-150812	RB-N-150812
LabID	160-13352-1	160-13352-1	160-13352-20	160-13352-20
LabID_Du	160-13352-1 DU	160-13352-1 DU	160-13352-20 DU	160-13352-20 DU
Method	GA-01-R	GA-01-R	9320	9315
Isotope	Cesium-137	Radium-226	Radium-228	Radium-226
MATRIX	SO	SO	LI	LI
RPctD (%)	50	75	118	487
DER (unitless)	1.56	2.56	0.66	0.6
Conc	0.22	5.25	-0.03	0.02
Conc Dup	0.13	2.38	-0.12	-0.01
Two S	0.09	1.86	0.2	0.06
Two S Dup	0.0663	1.24	0.172	0.059
UNITS	pCi/g	pCi/g	pCi/L	pCi/L
Ingrowth Days	3	3		

No qualifiers were assigned on the basis of laboratory replicate performance.

D. Matrix Spikes and Matrix Spike Duplicates (MARLAP 8.5.2.4)

Matrix spike samples provide information about the effect of each sample matrix on the preparation and measurement methodology. The test uncovers the possible existence of recovery problems, based on either a statistical test or a specified fixed control limit.

Discussion

Matrix spikes or matrix spike duplicates were not required by the QAPP. However, TestAmerica performed matrix spikes on alpha spectroscopy sample N003-SS003-1224-01. There are no rejection criteria since the samples were not required by the QAPP. Nonetheless, the spike percent recoveries were all reasonable.

Table summarizing matrix spike performance.

Matrix Spike Performance					
Spike Sample ID	Client Sample ID	Sample ID	Isotope	Spike Normalized Diff	Spike Recovery (%)
160-13352-17 MSD	N003-SS003-1224-01	160-13352-17	Uranium-233/234	0.93	107.4
160-13352-17 MS	N003-SS003-1224-01	160-13352-17	Uranium-233/234	-1.66	88
160-13352-17 MSD	N003-SS003-1224-01	160-13352-17	Thorium-230	0.58	105.3
160-13352-17 MS	N003-SS003-1224-01	160-13352-17	Thorium-230	1.96	119.5
160-13352-17 MSD	N003-SS003-1224-01	160-13352-17	Uranium-235/236	0.85	121.9
160-13352-17 MS	N003-SS003-1224-01	160-13352-17	Uranium-235/236	-0.63	86.4
160-13352-17 MSD	N003-SS003-1224-01	160-13352-17	Uranium-238	1.46	111.8
160-13352-17 MS	N003-SS003-1224-01	160-13352-17	Uranium-238	-2.2	84.8

No qualifiers were assigned on this basis.

E. Field Replicate Sample Performance

No criteria for field duplicates is given in the QAPP other than Worksheet 35, which states “Compare results of field duplicate (or replicate) analyses with RPD criteria.” No duplicate error ratio performance requirement is provided.

The relative percent difference (RPctD) were calculated for the field duplicate pair of samples. This statistic potentially can provide indications of the uniformity of the analyte in the media sampled. Values of relative percent difference greater than 40% suggest that the distribution of contaminants in the media sampled might be relatively heterogeneous. The more discordant field duplicates are provided in the table below.

Thorium-232 and potassium-40 results for the field duplicate pair had acceptable RPctD values. The prompt radium-226 values by gamma spectroscopy had an RPctD value greater than 40%. The results for the associated samples already carry a “P” and “J+” qualifier, however, so no additional qualifiers were assigned. The uranium-235/236 results for associated samples were assigned a “P” qualifier due to inconsistent performance of the field duplicates for this analyte.

Table of relatively discordant field duplicate values.

Client Sample ID	N003-SS003-1224-02	N003-SS003-1224-02	N003-SS003-1224-02	N003-SS003-1224-02
Client Dup Sample ID	N003-SS003-1224-01	N003-SS003-1224-01	N003-SS003-1224-01	N003-SS003-1224-01

Lab Sample ID	160-13352-18	160-13352-18	160-13352-18	160-13352-18
Lab Dup Sample ID	160-13352-17	160-13352-17	160-13352-17	160-13352-17
Isotope	Uranium-235/236	Thorium-232	K-40	Radium-226
Conc	0.1	2.79	8.09	4.87
Dup Conc	0.04	2.28	11.1	3.19
RpctD	92	20	31	42
DER	1.46	2	2.08	1.12
Ingrowth (d)			3	3

Qualifiers were assigned on the basis of field duplicate performance as described above.

F. Rinse Blank and Rinse Blank Replicate Sample Performance

Rinse blank duplicate performance was reasonable, with no radium-226 or radium-228 being detected in the rinse blanks. The DER values are reasonable. Cesium-137 was detected in rinse blank RB-N-150811 but not in the corresponding method blank. In every other case where an isotope was detected in a rinse blank, it was also detected in the associated method blank.

Table providing performance statistics for the rinse blank duplicate analyses.

Lab Sample ID	160-13352-20 DU	160-13352-20 DU
Lab Sample Dup ID	160-13352-20	160-13352-20
Client Sample ID	RB-N-150812	RB-N-150812
Isotope	Radium-228	Radium-226
Method	9320	9315
MATRIX	LI	LI
Conc	-0.12	-0.01
Dup Conc	-0.03	0.02
UNITS	pCi/L	pCi/L
RpctD	118	487
DER	0.66	0.6

Table of analytical results for rinse blanks.

Lab Sample ID	Client Sample ID	MATRIX	Method	Analyte	Conc	Two S	MDC	Nom CL	Preliminary Qualifiers
160-13352-19	RB-N-150811	LI	GA-01-R	Cesium-137	6.36	7.33	11.7	5.85	J
160-13352-19	RB-N-150811	LI	A-01-R	Uranium-233/234	0.04	0.08	0.15	0.07	Q, U
160-13352-19	RB-N-150811	LI	A-01-R	Thorium-230	0.22	0.14	0.14	0.07	J+, B+,
160-13352-19	RB-N-150811	LI	A-01-R	Thorium-228	0.02	0.09	0.19	0.09	Q, U
160-13352-19	RB-N-150811	LI	A-01-R	Uranium-235/236	0	0.01	0.06	0.03	P, Q, U
160-13352-19	RB-N-150811	LI	A-01-R	Thorium-232	0	0.06	0.15	0.07	Q, U
160-13352-19	RB-N-150811	LI	A-01-R	Uranium-238	0.03	0.06	0.12	0.06	Q, U
160-13352-19	RB-N-150811	LI	9320	Radium-228	-0.08	0.2	0.37	0.18	Q, U
160-13352-19	RB-N-150811	LI	9315	Radium-226	0.06	0.05	0.08	0.04	J+, B+, J
160-13352-20	RB-N-150812	LI	GA-01-R	Cesium-137	-0.47	5.6	10.3	5.15	Q, U
160-13352-20	RB-N-150812	LI	A-01-R	Uranium-233/234	0.01	0.06	0.13	0.07	Q, U
160-13352-20	RB-N-150812	LI	A-01-R	Thorium-230	0.19	0.12	0.13	0.06	J+, B+,
160-13352-20	RB-N-150812	LI	A-01-R	Thorium-228	0.03	0.08	0.15	0.08	Q, U
160-13352-20	RB-N-150812	LI	A-01-R	Uranium-235/236	0	0.01	0.07	0.04	P, Q, U
160-13352-20	RB-N-150812	LI	A-01-R	Thorium-232	0	0.04	0.11	0.05	Q, U
160-13352-20	RB-N-150812	LI	A-01-R	Uranium-238	0.03	0.05	0.09	0.05	Q, U
160-13352-20	RB-N-150812	LI	9320	Radium-228	-0.03	0.2	0.36	0.18	Q, U
160-13352-20	RB-N-150812	LI	9315	Radium-226	0.02	0.06	0.1	0.05	J+, B+, Q, U
160-13352-20 DU	RB-N-150812	LI	9320	Radium-228	-0.12	0.17	0.33	0.16	Q, U
160-13352-20 DU	RB-N-150812	LI	9315	Radium-226	-0.01	0.06	0.11	0.06	Q, U

7. TEST OF DETECTION AND UNUSUAL UNCERTAINTY EVALUATION

A. Detection (MARLAP 8.5.3.1)

An analyte is considered detected in a sample when the measured concentration exceeds the critical value. In instances where the analyte result was less than the critical value, a “U” qualifier was assigned to designate a result that was not detected. If the concentration of an analyte is between the MDC and the critical level, than a value of “J” is assigned. A value of “J” was also be assigned if the analyte is detected in the field blank and the concentration in the sample is less than 5 times the value in the field blank. A Q intermediate data qualifier was assigned if the sample is present at a concentration that was less than 0.82 times the two sigma total propagated uncertainty. Since the QAPP does not have precision criteria for analytical results, no sample was assigned a final data qualifier of Q.

Discussion

The following samples carry either a preliminary data qualifier or a final data qualifier.

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
LABQC	LCS 160-206049/2-A	LI	9315	Radium-226	B+,	
LABQC	MB 160-206049/1-A	LI	9315	Radium-226	J,	
LABQC	MB 160-206051/1-A	LI	9320	Radium-228	Q, U	
LABQC	LCSD 160-206043/3-A	LI	A-01-R	Thorium-228	J,	
LABQC	MB 160-206043/1-A	LI	A-01-R	Thorium-228	Q, U	
LABQC	LCS 160-206043/2-A	LI	A-01-R	Thorium-230	B+,	
LABQC	LCSD 160-206043/3-A	LI	A-01-R	Thorium-230	B+,	
LABQC	LCS 160-206002/2-A	SO	A-01-R	Thorium-230	B+,	
LABQC	MB 160-206043/1-A	LI	A-01-R	Thorium-232	Q, U	
LABQC	MB 160-206002/1-A	SO	A-01-R	Thorium-232	Q, U	
LABQC	LCSD 160-206043/3-A	LI	A-01-R	Thorium-232	Q, U	
LABQC	LCS 160-206252/2-A	SO	A-01-R	Uranium-233/234	B+,	
LABQC	MB 160-206044/1-A	LI	A-01-R	Uranium-233/234	Q, U	
LABQC	MB 160-206252/1-A	SO	A-01-R	Uranium-233/234	J,	
LABQC	MB 160-206252/1-A	SO	A-01-R	Uranium-235/236	Q, U	
LABQC	MB 160-206044/1-A	LI	A-01-R	Uranium-235/236	Q, U	
LABQC	LCS 160-206252/2-A	SO	A-01-R	Uranium-238	B+,	
LABQC	MB 160-206044/1-A	LI	A-01-R	Uranium-238	Q, U	
LABQC	LCS 160-206989/2-A	SO	GA-01-R	Cesium-137	P,	
LABQC	MB 160-206509/1-A	LI	GA-01-R	Cesium-137	Q, U	
LABQC	MB 160-206989/1-A	SO	GA-01-R	Cesium-137	P, Q, U	
LABQC	MB 160-206493/1-A	SO	GA-01-R	Radium-226	Q, U	
LABQC	MB 160-206989/1-A	SO	GA-01-R	Radium-226	P, J+, Q, U	
LABQC	MB 160-206989/1-A	SO	GA-01-R	Radium-228	Q, U	
N001-SS001-1224-01	160-13352-1	SO	A-01-R	Thorium-228	B+,	
N001-SS001-1224-01	160-13352-1	SO	A-01-R	Thorium-230	B+,	

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
N001-SS001-1224-01	160-13352-1	SO	A-01-R	Uranium-233/234	B+,	
N001-SS001-1224-01	160-13352-1	SO	A-01-R	Uranium-235/236	P, Q, J,	J
N001-SS001-1224-01	160-13352-1	SO	A-01-R	Uranium-238	B+,	
N001-SS001-1224-01	160-13352-1 DU	SO	GA-01-R	Bi-214	R,	R
N001-SS001-1224-01	160-13352-1	SO	GA-01-R	Bi-214	R,	R
N001-SS001-1224-01	160-13352-1	SO	GA-01-R	Cesium-137	P,	J
N001-SS001-1224-01	160-13352-1 DU	SO	GA-01-R	Cesium-137	P,	J
N001-SS001-1224-01	160-13352-1	SO	GA-01-R	Pb-214	R,	R
N001-SS001-1224-01	160-13352-1 DU	SO	GA-01-R	Pb-214	R,	R
N001-SS001-1224-01	160-13352-1 DU	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS001-1224-01	160-13352-1	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS002-1224-01	160-13352-2	SO	A-01-R	Thorium-228	B+,	
N001-SS002-1224-01	160-13352-2	SO	A-01-R	Thorium-230	B+,	
N001-SS002-1224-01	160-13352-2	SO	A-01-R	Uranium-233/234	B+,	
N001-SS002-1224-01	160-13352-2	SO	A-01-R	Uranium-235/236	P,	J
N001-SS002-1224-01	160-13352-2	SO	A-01-R	Uranium-238	B+,	
N001-SS002-1224-01	160-13352-2	SO	GA-01-R	Bi-214	R,	R
N001-SS002-1224-01	160-13352-2	SO	GA-01-R	Cesium-137	P,	J
N001-SS002-1224-01	160-13352-2	SO	GA-01-R	Pb-214	R,	R
N001-SS002-1224-01	160-13352-2	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS003-0012-01	160-13352-3	SO	A-01-R	Thorium-228	B+,	
N001-SS003-0012-01	160-13352-3	SO	A-01-R	Thorium-230	B+,	
N001-SS003-0012-01	160-13352-3	SO	A-01-R	Uranium-233/234	B+,	
N001-SS003-0012-01	160-13352-3	SO	A-01-R	Uranium-235/236	P, Q, U	U
N001-SS003-0012-01	160-13352-3	SO	A-01-R	Uranium-238	B+,	
N001-SS003-0012-01	160-13352-3	SO	GA-01-R	Bi-214	R,	R
N001-SS003-0012-01	160-13352-3	SO	GA-01-R	Cesium-137	P,	J
N001-SS003-0012-01	160-13352-3	SO	GA-01-R	Pb-214	R,	R
N001-SS003-0012-01	160-13352-3	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS004-0012-01	160-13352-4	SO	A-01-R	Thorium-228	B+,	
N001-SS004-0012-01	160-13352-4	SO	A-01-R	Thorium-230	B+,	
N001-SS004-0012-01	160-13352-4	SO	A-01-R	Uranium-233/234	B+,	
N001-SS004-0012-01	160-13352-4	SO	A-01-R	Uranium-235/236	P, Q, U	U
N001-SS004-0012-01	160-13352-4	SO	A-01-R	Uranium-238	B+,	
N001-SS004-0012-01	160-13352-4	SO	GA-01-R	Bi-214	R,	R
N001-SS004-0012-01	160-13352-4	SO	GA-01-R	Cesium-137	P, Q, U	U
N001-SS004-0012-01	160-13352-4	SO	GA-01-R	Pb-214	R,	R
N001-SS004-0012-01	160-13352-4	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS005-1830-01	160-13352-5	SO	A-01-R	Thorium-228	B+,	
N001-SS005-1830-01	160-13352-5	SO	A-01-R	Thorium-230	B+,	
N001-SS005-1830-01	160-13352-5	SO	A-01-R	Uranium-233/234	B+,	
N001-SS005-1830-01	160-13352-5	SO	A-01-R	Uranium-235/236	P,	J
N001-SS005-1830-01	160-13352-5	SO	A-01-R	Uranium-238	B+,	

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
N001-SS005-1830-01	160-13352-5	SO	GA-01-R	Bi-214	R,	R
N001-SS005-1830-01	160-13352-5	SO	GA-01-R	Cesium-137	P,	J
N001-SS005-1830-01	160-13352-5	SO	GA-01-R	Pb-214	R,	R
N001-SS005-1830-01	160-13352-5	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS006-0012-01	160-13352-6	SO	A-01-R	Thorium-228	B+,	
N001-SS006-0012-01	160-13352-6	SO	A-01-R	Thorium-230	B+,	
N001-SS006-0012-01	160-13352-6	SO	A-01-R	Uranium-233/234	B+,	
N001-SS006-0012-01	160-13352-6	SO	A-01-R	Uranium-235/236	P,	J
N001-SS006-0012-01	160-13352-6	SO	A-01-R	Uranium-238	B+,	
N001-SS006-0012-01	160-13352-6	SO	GA-01-R	Bi-214	R,	R
N001-SS006-0012-01	160-13352-6	SO	GA-01-R	Cesium-137	P,	J
N001-SS006-0012-01	160-13352-6	SO	GA-01-R	Pb-214	R,	R
N001-SS006-0012-01	160-13352-6	SO	GA-01-R	Radium-226	P, J+,	J+
N001-SS007-0012-01	160-13352-7	SO	A-01-R	Thorium-228	B+,	
N001-SS007-0012-01	160-13352-7	SO	A-01-R	Thorium-230	B+,	
N001-SS007-0012-01	160-13352-7	SO	A-01-R	Uranium-233/234	B+,	
N001-SS007-0012-01	160-13352-7	SO	A-01-R	Uranium-235/236	P,	J
N001-SS007-0012-01	160-13352-7	SO	A-01-R	Uranium-238	B+,	
N001-SS007-0012-01	160-13352-7	SO	GA-01-R	Bi-214	R,	R
N001-SS007-0012-01	160-13352-7	SO	GA-01-R	Cesium-137	P, Q, U	U
N001-SS007-0012-01	160-13352-7	SO	GA-01-R	Pb-214	R,	R
N001-SS007-0012-01	160-13352-7	SO	GA-01-R	Radium-226	P, J+,	J+
N002-SS001-0012-01	160-13352-8	SO	A-01-R	Thorium-228	B+,	
N002-SS001-0012-01	160-13352-8	SO	A-01-R	Thorium-230	B+,	
N002-SS001-0012-01	160-13352-8	SO	A-01-R	Uranium-233/234	B+,	
N002-SS001-0012-01	160-13352-8	SO	A-01-R	Uranium-235/236	P, J,	J
N002-SS001-0012-01	160-13352-8	SO	A-01-R	Uranium-238	B+,	
N002-SS001-0012-01	160-13352-8	SO	GA-01-R	Bi-214	R,	R
N002-SS001-0012-01	160-13352-8	SO	GA-01-R	Cesium-137	P, Q, U	U
N002-SS001-0012-01	160-13352-8	SO	GA-01-R	Pb-214	R,	R
N002-SS001-0012-01	160-13352-8	SO	GA-01-R	Radium-226	P, J+,	J+
N002-SS002-0012-01	160-13352-9	SO	A-01-R	Thorium-228	B+,	
N002-SS002-0012-01	160-13352-9	SO	A-01-R	Thorium-230	B+,	
N002-SS002-0012-01	160-13352-9	SO	A-01-R	Uranium-233/234	B+,	
N002-SS002-0012-01	160-13352-9	SO	A-01-R	Uranium-235/236	P,	J
N002-SS002-0012-01	160-13352-9	SO	A-01-R	Uranium-238	B+,	
N002-SS002-0012-01	160-13352-9	SO	GA-01-R	Bi-214	R,	R
N002-SS002-0012-01	160-13352-9	SO	GA-01-R	Cesium-137	P, Q, U	U
N002-SS002-0012-01	160-13352-9	SO	GA-01-R	Pb-214	R,	R
N002-SS002-0012-01	160-13352-9	SO	GA-01-R	Radium-226	P, J+,	J+
N002-SS003-0012-01	160-13352-10	SO	A-01-R	Thorium-228	B+,	
N002-SS003-0012-01	160-13352-10	SO	A-01-R	Thorium-230	B+,	
N002-SS003-0012-01	160-13352-10	SO	A-01-R	Uranium-233/234	B+,	

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
N002-SS003-0012-01	160-13352-10	SO	A-01-R	Uranium-235/236	P, J,	J
N002-SS003-0012-01	160-13352-10	SO	A-01-R	Uranium-238	B+,	
N002-SS003-0012-01	160-13352-10	SO	GA-01-R	Bi-214	R,	R
N002-SS003-0012-01	160-13352-10	SO	GA-01-R	Cesium-137	P, Q, U	U
N002-SS003-0012-01	160-13352-10	SO	GA-01-R	Pb-214	R,	R
N002-SS003-0012-01	160-13352-10	SO	GA-01-R	Radium-226	P, J+,	J+
N002-SS004-0012-01	160-13352-11	SO	A-01-R	Thorium-228	B+,	
N002-SS004-0012-01	160-13352-11	SO	A-01-R	Thorium-230	B+,	
N002-SS004-0012-01	160-13352-11	SO	A-01-R	Uranium-233/234	B+,	
N002-SS004-0012-01	160-13352-11	SO	A-01-R	Uranium-235/236	P, J,	J
N002-SS004-0012-01	160-13352-11	SO	A-01-R	Uranium-238	B+,	
N002-SS004-0012-01	160-13352-11	SO	GA-01-R	Bi-214	R,	R
N002-SS004-0012-01	160-13352-11	SO	GA-01-R	Cesium-137	P,	J
N002-SS004-0012-01	160-13352-11	SO	GA-01-R	Pb-214	R,	R
N002-SS004-0012-01	160-13352-11	SO	GA-01-R	Radium-226	P, J+,	J+
N002-SS005-0012-01	160-13352-12	SO	A-01-R	Thorium-228	B+,	
N002-SS005-0012-01	160-13352-12	SO	A-01-R	Thorium-230	B+,	
N002-SS005-0012-01	160-13352-12	SO	A-01-R	Uranium-233/234	B+,	
N002-SS005-0012-01	160-13352-12	SO	A-01-R	Uranium-235/236	P,	J
N002-SS005-0012-01	160-13352-12	SO	A-01-R	Uranium-238	B+,	
N002-SS005-0012-01	160-13352-12	SO	GA-01-R	Bi-214	R,	R
N002-SS005-0012-01	160-13352-12	SO	GA-01-R	Cesium-137	P, Q, U	U
N002-SS005-0012-01	160-13352-12	SO	GA-01-R	Pb-214	R,	R
N002-SS005-0012-01	160-13352-12	SO	GA-01-R	Radium-226	P, J+,	J+
N002-SS006-2436-01	160-13352-13	SO	A-01-R	Thorium-228	B+,	
N002-SS006-2436-01	160-13352-13	SO	A-01-R	Thorium-230	B+,	
N002-SS006-2436-01	160-13352-13	SO	A-01-R	Uranium-233/234	B+,	
N002-SS006-2436-01	160-13352-13	SO	A-01-R	Uranium-235/236	P,	J
N002-SS006-2436-01	160-13352-13	SO	A-01-R	Uranium-238	B+,	
N002-SS006-2436-01	160-13352-13	SO	GA-01-R	Bi-214	R,	R
N002-SS006-2436-01	160-13352-13	SO	GA-01-R	Cesium-137	P, Q, U	U
N002-SS006-2436-01	160-13352-13	SO	GA-01-R	Pb-214	R,	R
N002-SS006-2436-01	160-13352-13	SO	GA-01-R	Radium-226	P, J+, J,	J+
N002-TRENCH-0003-01	160-13352-14	SO	A-01-R	Thorium-228	J+, B+,	J+
N002-TRENCH-0003-01	160-13352-14	SO	A-01-R	Thorium-230	J+, B+,	J+
N002-TRENCH-0003-01	160-13352-14	SO	A-01-R	Uranium-233/234	B+,	
N002-TRENCH-0003-01	160-13352-14	SO	A-01-R	Uranium-235/236	P, Q, U	U
N002-TRENCH-0003-01	160-13352-14	SO	A-01-R	Uranium-238	B+,	

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
N002-TRENCH-0003-01	160-13352-14	SO	GA-01-R	Cesium-137	P, Q, U	U
N002-TRENCH-0003-01	160-13352-14	SO	GA-01-R	K-40	J,	J
N002-TRENCH-0003-01	160-13352-14	SO	GA-01-R	Pb-214	R,	R
N002-TRENCH-0003-01	160-13352-14	SO	GA-01-R	Radium-226	P, J+, Q, U	U
N002-TRENCH-0003-01	160-13352-14	SO	GA-01-R	Radium-228	J,	J
N003-SS001-1022-01	160-13352-15	SO	A-01-R	Thorium-228	B+,	
N003-SS001-1022-01	160-13352-15	SO	A-01-R	Thorium-230	B+,	
N003-SS001-1022-01	160-13352-15	SO	A-01-R	Uranium-233/234	B+,	
N003-SS001-1022-01	160-13352-15	SO	A-01-R	Uranium-235/236	P, J,	J
N003-SS001-1022-01	160-13352-15	SO	A-01-R	Uranium-238	B+,	
N003-SS001-1022-01	160-13352-15	SO	GA-01-R	Bi-214	R,	R
N003-SS001-1022-01	160-13352-15	SO	GA-01-R	Cesium-137	P, Q, U	U
N003-SS001-1022-01	160-13352-15	SO	GA-01-R	Pb-214	R,	R
N003-SS001-1022-01	160-13352-15	SO	GA-01-R	Radium-226	P, J+,	J+
N003-SS002-2436-01	160-13352-16	SO	A-01-R	Thorium-228	B+,	
N003-SS002-2436-01	160-13352-16	SO	A-01-R	Thorium-230	B+,	
N003-SS002-2436-01	160-13352-16	SO	A-01-R	Uranium-233/234	B+,	
N003-SS002-2436-01	160-13352-16	SO	A-01-R	Uranium-235/236	P, Q, U	U
N003-SS002-2436-01	160-13352-16	SO	A-01-R	Uranium-238	B+,	
N003-SS002-2436-01	160-13352-16	SO	GA-01-R	Bi-214	R,	R
N003-SS002-2436-01	160-13352-16	SO	GA-01-R	Cesium-137	P, Q, U	U
N003-SS002-2436-01	160-13352-16	SO	GA-01-R	Pb-214	R,	R
N003-SS002-2436-01	160-13352-16	SO	GA-01-R	Radium-226	P, J+,	J+
N003-SS003-1224-01	160-13352-17	SO	A-01-R	Thorium-228	B+,	
N003-SS003-1224-01	160-13352-17 MS	SO	A-01-R	Thorium-230	B+,	
N003-SS003-1224-01	160-13352-17 MSD	SO	A-01-R	Thorium-230	B+,	
N003-SS003-1224-01	160-13352-17	SO	A-01-R	Thorium-230	B+,	
N003-SS003-1224-01	160-13352-17 MS	SO	A-01-R	Uranium-233/234	B+,	
N003-SS003-1224-01	160-13352-17 MSD	SO	A-01-R	Uranium-233/234	B+,	
N003-SS003-1224-01	160-13352-17	SO	A-01-R	Uranium-233/234	B+,	
N003-SS003-1224-01	160-13352-17	SO	A-01-R	Uranium-235/236	P, Q, U	U
N003-SS003-1224-01	160-13352-17	SO	A-01-R	Uranium-238	B+,	
N003-SS003-1224-01	160-13352-17 MS	SO	A-01-R	Uranium-238	B+,	
N003-SS003-1224-01	160-13352-17 MSD	SO	A-01-R	Uranium-238	B+,	
N003-SS003-1224-01	160-13352-17	SO	GA-01-R	Bi-214	R,	R
N003-SS003-1224-01	160-13352-17	SO	GA-01-R	Cesium-137	P, J,	J
N003-SS003-1224-01	160-13352-17	SO	GA-01-R	Pb-214	R,	R
N003-SS003-1224-01	160-13352-17	SO	GA-01-R	Radium-226	P, J+,	J+
N003-SS003-1224-02	160-13352-18	SO	A-01-R	Thorium-228	B+,	

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
N003-SS003-1224-02	160-13352-18	SO	A-01-R	Thorium-230	B+,	
N003-SS003-1224-02	160-13352-18	SO	A-01-R	Uranium-233/234	B+,	
N003-SS003-1224-02	160-13352-18	SO	A-01-R	Uranium-235/236	P,	J
N003-SS003-1224-02	160-13352-18	SO	A-01-R	Uranium-238	B+,	
N003-SS003-1224-02	160-13352-18	SO	GA-01-R	Bi-214	R,	R
N003-SS003-1224-02	160-13352-18	SO	GA-01-R	Cesium-137	P, J,	J
N003-SS003-1224-02	160-13352-18	SO	GA-01-R	Pb-214	R,	R
N003-SS003-1224-02	160-13352-18	SO	GA-01-R	Radium-226	P, J+,	J+
RB-N-150811	160-13352-19	LI	9315	Radium-226	J+, B+, J,	J+
RB-N-150811	160-13352-19	LI	9320	Radium-228	Q, U	U
RB-N-150811	160-13352-19	LI	A-01-R	Thorium-228	Q, U	U
RB-N-150811	160-13352-19	LI	A-01-R	Thorium-230	J+, B+,	J+
RB-N-150811	160-13352-19	LI	A-01-R	Thorium-232	Q, U	U
RB-N-150811	160-13352-19	LI	A-01-R	Uranium-233/234	Q, U	U
RB-N-150811	160-13352-19	LI	A-01-R	Uranium-235/236	P, Q, U	U
RB-N-150811	160-13352-19	LI	A-01-R	Uranium-238	Q, U	U
RB-N-150811	160-13352-19	LI	GA-01-R	Cesium-137	J,	J
RB-N-150812	160-13352-20 DU	LI	9315	Radium-226	Q, U	U
RB-N-150812	160-13352-20	LI	9315	Radium-226	J+, B+, Q, U	U
RB-N-150812	160-13352-20 DU	LI	9320	Radium-228	Q, U	U
RB-N-150812	160-13352-20	LI	9320	Radium-228	Q, U	U
RB-N-150812	160-13352-20	LI	A-01-R	Thorium-228	Q, U	U
RB-N-150812	160-13352-20	LI	A-01-R	Thorium-230	J+, B+,	J+
RB-N-150812	160-13352-20	LI	A-01-R	Thorium-232	Q, U	U
RB-N-150812	160-13352-20	LI	A-01-R	Uranium-233/234	Q, U	U
RB-N-150812	160-13352-20	LI	A-01-R	Uranium-235/236	P, Q, U	U
RB-N-150812	160-13352-20	LI	A-01-R	Uranium-238	Q, U	U
RB-N-150812	160-13352-20	LI	GA-01-R	Cesium-137	Q, U	U

B. **Detection Capability (MARLAP 8.5.3.2)**

If the project requires a certain detection capability, the requirement should be expressed as a required minimum detectable concentration (RMDC). A failure to meet the RMDC is more often an important issue when the analyte is not detected.

The RMDC is usually specified in the QAPP and is compared to the sample-specific MDC achieved by the method. Required detection limits are provided in the QAPP. Samples are qualified “UJ” where no activity was detected in a sample but the required detection limit was not attained.

Discussion

In general, only the samples that were analyzed for radium-226 by gamma spectroscopy using the 186 Kev gamma photon had difficulty attaining the RL of 1 pCi/g. In practice this did not result in any samples being assigned a UJ qualifier because all of the reported results were substantially greater than 1 pCi/g.

C. **Large or Unusual Uncertainty (MARLAP 8.5.3.3)**

The reported combined standard uncertainty is compared to the maximum allowable standard uncertainty. Either absolute (in concentration units) or relative uncertainties (expressed as a percent) are used in the comparison, depending on the reported concentration.

Discussion

There was no specific requirement in the project QAPP for qualifying results based on maximum allowable uncertainty. Samples were assigned an intermediate qualifier ‘Q’ if the sample result was not statistically distinguishable from zero based on a one-tailed 95% confidence bound.

Samples were qualified as ‘J’ if activity was found in the blank and the sample result was less than 5 times the result in the blank, or if there was some other reason to conclude that the analytical result was biased high and more uncertain than usual.

A ‘UJ’ qualifier was assigned if the analyte was not detected, but the required MDA was not attained. A number of specific problems also resulted in assignment of a J qualifier where results were more uncertain than usual.

8. SUMMARY OF DATA USABILITY

There were a total of 10 radionuclide results associated with the field samples in this data package. The count of each final qualifier type for field samples is provided in the following table.

- Results that were greater than the MDC and do not have other recognized problems are not flagged.
- Results that were below the MDC but statistically positive at the 95% confidence level and above the nominal critical level were “J” flagged as estimated (having more uncertainty than usual).
- Results that were not detected, but had an MDC below the MDC that the QAPP required were qualified with a “U” validation flag.
- Results that were not detected, but had an MDC greater than the MDC that the QAPP required were qualified with a “UJ” validation flag.
- Results with severe problems (for instance lead-214 and bismuth-214 values from a 3-day gamma count, which should not be relied on to make hardly any decision) were flagged as “R” and were rejected.

Table of the number of each of the various final data qualifiers.

Final Qualifiers	Count Of Final Qualifier
	216
J	25
J+	23
R	37
U	32

The distribution of qualifiers among field samples is further broken down in the following table.

Table of counts of various qualifiers by counting technique

METHOD	DESCRIPTION	FINAL QUALIFIER	COUNT
9315	Separation and Gas Flow Proportional Counting (Alpha)	J+	1
9315	Separation and Gas Flow Proportional Counting (Alpha)	U	2
9320	Separation and Gas Flow Proportional Counting (Beta)	U	3
A-01-R	Chemical Separation and Alpha Spectroscopy		96
A-01-R	Chemical Separation and Alpha Spectroscopy	J	13
A-01-R	Chemical Separation and Alpha Spectroscopy	J+	4
A-01-R	Chemical Separation and Alpha Spectroscopy	U	15
GA-01-R	Gamma Spectroscopy		120
GA-01-R	Gamma Spectroscopy	J	12
GA-01-R	Gamma Spectroscopy	J+	18
GA-01-R	Gamma Spectroscopy	R	37
GA-01-R	Gamma Spectroscopy	U	12

9. REFERENCES

SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN. EPA CONTRACT NO: EP-S2-14-01, TDD NO: TO-0006-0064. DOCUMENT CONTROL NO: RST3-02-D-0037. August 2015.

Multi-Agency Radiological Laboratory Analytical Protocols Manual, Volume I, NUREG-1576, EPA 402-B-04-001A, NTIS PB2004-105421, July 2004.

10. APPENDED DOCUMENTS

- Consolidated table of analytical results with qualifiers (18 pages).
- Radiological Data Verification/Validation Checklist (2 pages).
- Excerpts from Level IV Reports of Analysis, Chain of Custody, Narrative, Analytical Results (141 pages).



Niagara Falls Boulevard Site

DCN: RST3-02-F-0062

Test America data packages 160-13352-2, 160-13352-1, and 160-13352-3

Data Package #

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
160-13352-1									
LABQC									
A-01-R	Thorium-228	LCSD 160-20604	LI	0.09	0.08	0.09	J,		pCi/L
A-01-R	Thorium-228	MB 160-206002/	SO	0.06	0.05	0.05			pCi/g
A-01-R	Thorium-228	MB 160-206043/	LI	0.01	0.04	0.1	Q, U		pCi/L
A-01-R	Thorium-230	MB 160-206043/	LI	0.14	0.1	0.11			pCi/L
A-01-R	Thorium-230	LCS 160-206043/	LI	8.27	1.03	0.09	B+,		pCi/L
A-01-R	Thorium-230	LCS 160-206002/	SO	25.4	2.5	0.08	B+,		pCi/g
A-01-R	Thorium-230	LCSD 160-20604	LI	8.51	1.03	0.09	B+,		pCi/L
A-01-R	Thorium-230	MB 160-206002/	SO	0.11	0.06	0.02			pCi/g
A-01-R	Thorium-232	MB 160-206002/	SO	0.01	0.02	0.04	Q, U		pCi/g
A-01-R	Thorium-232	MB 160-206043/	LI	0.01	0.04	0.1	Q, U		pCi/L
A-01-R	Thorium-232	LCSD 160-20604	LI	0	0.01	0.08	Q, U		pCi/L
A-01-R	Uranium-233/234	LCS 160-206252/	SO	6.35	0.72	0.05	B+,		pCi/g
A-01-R	Uranium-233/234	MB 160-206044/	LI	0	0.01	0.08	Q, U		pCi/L
A-01-R	Uranium-233/234	MB 160-206252/	SO	0.03	0.03	0.04	J,		pCi/g
A-01-R	Uranium-233/234	LCS 160-206044/	LI	12.1	1.41	0.12			pCi/L
A-01-R	Uranium-233/234	LCSD 160-20604	LI	13.47	1.54	0.11			pCi/L
A-01-R	Uranium-235/236	LCSD 160-20604	LI	0.59	0.25	0.12			pCi/L
A-01-R	Uranium-235/236	LCS 160-206252/	SO	0.32	0.12	0.05			pCi/g
A-01-R	Uranium-235/236	LCS 160-206044/	LI	0.68	0.27	0.12			pCi/L
A-01-R	Uranium-235/236	MB 160-206252/	SO	0	0.01	0.03	Q, U		pCi/g
A-01-R	Uranium-235/236	MB 160-206044/	LI	0	0.01	0.06	Q, U		pCi/L

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-238	LCS 160-206044/	LI	12.76	1.47	0.06			pCi/L
A-01-R	Uranium-238	MB 160-206044/	LI	0	0.01	0.05	Q, U		pCi/L
A-01-R	Uranium-238	LCS 160-206252/	SO	6.49	0.73	0.03	B+,		pCi/g
A-01-R	Uranium-238	MB 160-206252/	SO	0.03	0.03	0.03			pCi/g
A-01-R	Uranium-238	LCSD 160-20604	LI	13.03	1.5	0.06			pCi/L
GA-01-R	Americium-241	LCS 160-206509/	LI	13430	15500	435			pCi/L
GA-01-R	Cesium-137	MB 160-206509/	LI	1.61	8.11	14.9	Q, U		pCi/L
GA-01-R	Cesium-137	LCS 160-206509/	LI	47620	4770	151			pCi/L
GA-01-R	Cobalt-60	LCS 160-206509/	LI	46270	4580	119			pCi/L
N001-SS001-1224-0									
A-01-R	Thorium-228	160-13352-1	SO	0.81	0.17	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-1	SO	0.84	0.17	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-1	SO	0.71	0.16	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-1	SO	0.79	0.19	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-1	SO	0.03	0.04	0.06	P, Q, J,	J	pCi/g
A-01-R	Uranium-238	160-13352-1	SO	0.8	0.19	0.05	B+,		pCi/g
N001-SS002-1224-0									
A-01-R	Thorium-228	160-13352-2	SO	1.13	0.22	0.09	B+,		pCi/g
A-01-R	Thorium-230	160-13352-2	SO	1.22	0.23	0.08	B+,		pCi/g
A-01-R	Thorium-232	160-13352-2	SO	0.96	0.2	0.06			pCi/g
A-01-R	Uranium-233/234	160-13352-2	SO	1.63	0.28	0.06	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-2	SO	0.07	0.06	0.06	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-2	SO	1.09	0.22	0.07	B+,		pCi/g
N001-SS003-0012-0									
A-01-R	Thorium-228	160-13352-3	SO	0.94	0.19	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-3	SO	1.04	0.2	0.02	B+,		pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Thorium-232	160-13352-3	SO	0.92	0.19	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-3	SO	1.12	0.22	0.06	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-3	SO	0.01	0.02	0.06	P, Q, U	U	pCi/g
A-01-R	Uranium-238	160-13352-3	SO	1.03	0.21	0.05	B+,		pCi/g
N001-SS004-0012-0									
A-01-R	Thorium-228	160-13352-4	SO	0.94	0.2	0.09	B+,		pCi/g
A-01-R	Thorium-230	160-13352-4	SO	1.06	0.21	0.07	B+,		pCi/g
A-01-R	Thorium-232	160-13352-4	SO	1	0.2	0.04			pCi/g
A-01-R	Uranium-233/234	160-13352-4	SO	0.87	0.2	0.09	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-4	SO	0.03	0.04	0.07	P, Q, U	U	pCi/g
A-01-R	Uranium-238	160-13352-4	SO	0.78	0.18	0.05	B+,		pCi/g
N001-SS005-1830-0									
A-01-R	Thorium-228	160-13352-5	SO	1.36	0.24	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-5	SO	1.03	0.2	0.07	B+,		pCi/g
A-01-R	Thorium-232	160-13352-5	SO	1.39	0.24	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-5	SO	0.79	0.18	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-5	SO	0.07	0.06	0.05	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-5	SO	1.05	0.21	0.05	B+,		pCi/g
N001-SS006-0012-0									
A-01-R	Thorium-228	160-13352-6	SO	10.8	1.09	0.1	B+,		pCi/g
A-01-R	Thorium-230	160-13352-6	SO	3.96	0.5	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-6	SO	9.56	0.99	0.04			pCi/g
A-01-R	Uranium-233/234	160-13352-6	SO	3.35	0.44	0.09	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-6	SO	0.13	0.08	0.06	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-6	SO	3.92	0.49	0.05	B+,		pCi/g
N001-SS007-0012-0									

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Thorium-228	160-13352-7	SO	0.83	0.19	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-7	SO	1.06	0.21	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-7	SO	0.82	0.18	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-7	SO	0.71	0.17	0.03	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-7	SO	0.07	0.06	0.05	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-7	SO	0.81	0.18	0.05	B+,		pCi/g
N002-SS001-0012-0									
A-01-R	Thorium-228	160-13352-8	SO	3.94	0.5	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-8	SO	3.1	0.42	0.07	B+,		pCi/g
A-01-R	Thorium-232	160-13352-8	SO	3.41	0.45	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-8	SO	2.67	0.38	0.08	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-8	SO	0.05	0.05	0.05	P, J,	J	pCi/g
A-01-R	Uranium-238	160-13352-8	SO	2.56	0.37	0.07	B+,		pCi/g
N002-SS002-0012-0									
A-01-R	Thorium-228	160-13352-9	SO	7.97	0.85	0.07	B+,		pCi/g
A-01-R	Thorium-230	160-13352-9	SO	3.18	0.43	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-9	SO	7.17	0.78	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-9	SO	2.5	0.37	0.06	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-9	SO	0.2	0.1	0.04	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-9	SO	2.36	0.36	0.05	B+,		pCi/g
N002-SS003-0012-0									
A-01-R	Thorium-228	160-13352-10	SO	1.12	0.22	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-10	SO	1.18	0.22	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-10	SO	1.06	0.21	0.04			pCi/g
A-01-R	Uranium-233/234	160-13352-10	SO	1.41	0.25	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-10	SO	0.04	0.04	0.06	P, J,	J	pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-238	160-13352-10	SO	1.01	0.21	0.05	B+,		pCi/g
N002-SS004-0012-0									
A-01-R	Thorium-228	160-13352-11	SO	0.94	0.18	0.07	B+,		pCi/g
A-01-R	Thorium-230	160-13352-11	SO	0.87	0.17	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-11	SO	0.87	0.17	0.04			pCi/g
A-01-R	Uranium-233/234	160-13352-11	SO	1.31	0.25	0.08	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-11	SO	0.06	0.06	0.07	P, J,	J	pCi/g
A-01-R	Uranium-238	160-13352-11	SO	1.19	0.24	0.08	B+,		pCi/g
N002-SS005-0012-0									
A-01-R	Thorium-228	160-13352-12	SO	0.86	0.18	0.03	B+,		pCi/g
A-01-R	Thorium-230	160-13352-12	SO	0.9	0.19	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-12	SO	0.9	0.19	0.06			pCi/g
A-01-R	Uranium-233/234	160-13352-12	SO	0.72	0.17	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-12	SO	0.08	0.06	0.06	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-12	SO	0.69	0.17	0.07	B+,		pCi/g
N002-SS006-2436-0									
A-01-R	Thorium-228	160-13352-13	SO	0.89	0.22	0.09	B+,		pCi/g
A-01-R	Thorium-230	160-13352-13	SO	0.79	0.2	0.06	B+,		pCi/g
A-01-R	Thorium-232	160-13352-13	SO	1.02	0.24	0.07			pCi/g
A-01-R	Uranium-233/234	160-13352-13	SO	0.65	0.16	0.04	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-13	SO	0.05	0.05	0.03	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-13	SO	0.73	0.18	0.05	B+,		pCi/g
N002-TRENCH-0003									
A-01-R	Thorium-228	160-13352-14	SO	0.2	0.11	0.1	J+, B+,	J+	pCi/g
A-01-R	Thorium-230	160-13352-14	SO	0.35	0.14	0.08	J+, B+,	J+	pCi/g
A-01-R	Thorium-232	160-13352-14	SO	0.17	0.1	0.08			pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-233/234	160-13352-14	SO	0.24	0.1	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-14	SO	0.01	0.02	0.03	P, Q, U	U	pCi/g
A-01-R	Uranium-238	160-13352-14	SO	0.25	0.1	0.04	B+,		pCi/g
N003-SS001-1022-0									
A-01-R	Thorium-228	160-13352-15	SO	0.56	0.15	0.1	B+,		pCi/g
A-01-R	Thorium-230	160-13352-15	SO	0.74	0.18	0.07	B+,		pCi/g
A-01-R	Thorium-232	160-13352-15	SO	0.59	0.15	0.03			pCi/g
A-01-R	Uranium-233/234	160-13352-15	SO	0.87	0.19	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-15	SO	0.06	0.05	0.06	P, J,	J	pCi/g
A-01-R	Uranium-238	160-13352-15	SO	0.86	0.19	0.05	B+,		pCi/g
N003-SS002-2436-0									
A-01-R	Thorium-228	160-13352-16	SO	0.63	0.16	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-16	SO	0.8	0.18	0.04	B+,		pCi/g
A-01-R	Thorium-232	160-13352-16	SO	0.51	0.14	0.05			pCi/g
A-01-R	Uranium-233/234	160-13352-16	SO	0.48	0.14	0.06	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-16	SO	0	0.01	0.03	P, Q, U	U	pCi/g
A-01-R	Uranium-238	160-13352-16	SO	0.52	0.15	0.06	B+,		pCi/g
N003-SS003-1224-0									
A-01-R	Thorium-228	160-13352-17	SO	2.31	0.34	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13352-17 M	SO	6.42	0.72	0.06	B+,		pCi/g
A-01-R	Thorium-230	160-13352-17 M	SO	5.86	0.66	0.06	B+,		pCi/g
A-01-R	Thorium-230	160-13352-17	SO	1.65	0.27	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13352-17	SO	2.28	0.33	0.04			pCi/g
A-01-R	Uranium-233/234	160-13352-17	SO	1.73	0.3	0.06	B+,		pCi/g
A-01-R	Uranium-233/234	160-13352-17 M	SO	7.3	0.8	0.06	B+,		pCi/g
A-01-R	Uranium-233/234	160-13352-17 M	SO	8.55	0.92	0.08	B+,		pCi/g

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-235/236	160-13352-17	SO	0.04	0.05	0.08	P, Q, U	U	pCi/g
A-01-R	Uranium-235/236	160-13352-17 M	SO	0.3	0.12	0.05			pCi/g
A-01-R	Uranium-235/236	160-13352-17 M	SO	0.41	0.15	0.08			pCi/g
A-01-R	Uranium-238	160-13352-17 M	SO	8.88	0.95	0.05	B+,		pCi/g
A-01-R	Uranium-238	160-13352-17	SO	1.62	0.29	0.06	B+,		pCi/g
A-01-R	Uranium-238	160-13352-17 M	SO	7.11	0.78	0.06	B+,		pCi/g
N003-SS003-1224-0									
A-01-R	Thorium-228	160-13352-18	SO	2.63	0.38	0.09	B+,		pCi/g
A-01-R	Thorium-230	160-13352-18	SO	1.96	0.31	0.06	B+,		pCi/g
A-01-R	Thorium-232	160-13352-18	SO	2.79	0.39	0.06			pCi/g
A-01-R	Uranium-233/234	160-13352-18	SO	1.74	0.3	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13352-18	SO	0.1	0.07	0.06	P,	J	pCi/g
A-01-R	Uranium-238	160-13352-18	SO	1.84	0.3	0.05	B+,		pCi/g
RB-N-150811									
A-01-R	Thorium-228	160-13352-19	LI	0.02	0.09	0.18	Q, U	U	pCi/L
A-01-R	Thorium-230	160-13352-19	LI	0.22	0.14	0.14	J+, B+,	J+	pCi/L
A-01-R	Thorium-232	160-13352-19	LI	0	0.06	0.15	Q, U	U	pCi/L
A-01-R	Uranium-233/234	160-13352-19	LI	0.04	0.08	0.15	Q, U	U	pCi/L
A-01-R	Uranium-235/236	160-13352-19	LI	0	0.01	0.06	P, Q, U	U	pCi/L
A-01-R	Uranium-238	160-13352-19	LI	0.03	0.06	0.12	Q, U	U	pCi/L
GA-01-R	Cesium-137	160-13352-19	LI	6.36	7.33	11.7	J,	J	pCi/L
RB-N-150812									
A-01-R	Thorium-228	160-13352-20	LI	0.03	0.08	0.15	Q, U	U	pCi/L
A-01-R	Thorium-230	160-13352-20	LI	0.19	0.12	0.13	J+, B+,	J+	pCi/L
A-01-R	Thorium-232	160-13352-20	LI	0	0.04	0.11	Q, U	U	pCi/L
A-01-R	Uranium-233/234	160-13352-20	LI	0.01	0.06	0.13	Q, U	U	pCi/L

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-235/236	160-13352-20	LI	0	0.01	0.07	P, Q, U	U	pCi/L
A-01-R	Uranium-238	160-13352-20	LI	0.03	0.05	0.09	Q, U	U	pCi/L
GA-01-R	Cesium-137	160-13352-20	LI	-0.47	5.6	10.3	Q, U	U	pCi/L
160-13352-2									
LABQC									
9315	Radium-226	LCS 160-206049/	LI	12.61	1.24	0.12	B+,		pCi/L
9315	Radium-226	MB 160-206049/	LI	0.05	0.05	0.09	J,		pCi/L
9320	Radium-228	LCS 160-206051/	LI	2.46	0.43	0.36			pCi/L
9320	Radium-228	MB 160-206051/	LI	-0.03	0.19	0.34	Q, U		pCi/L
GA-01-R	Americium-241	LCS 160-206493/	SO	97.53	10.2	1.17			pCi/g
GA-01-R	Cesium-137	LCS 160-206493/	SO	30.36	3.23	0.26			pCi/g
GA-01-R	Cobalt-60	LCS 160-206493/	SO	19.06	1.96	0.1			pCi/g
GA-01-R	Radium-226	MB 160-206493/	SO	-0.06	1.11	0.16	Q, U		pCi/g
N001-SS001-1224-0									
GA-01-R	Radium-226	160-13352-1	SO	0.86	0.23	0.17			pCi/g
GA-01-R	Radium-226	160-13352-1 DU	SO	1.08	0.26	0.19			pCi/g
N001-SS002-1224-0									
GA-01-R	Radium-226	160-13352-2	SO	0.71	0.17	0.14			pCi/g
N001-SS003-0012-0									
GA-01-R	Radium-226	160-13352-3	SO	0.96	0.25	0.2			pCi/g
N001-SS004-0012-0									
GA-01-R	Radium-226	160-13352-4	SO	1.13	0.28	0.17			pCi/g
N001-SS005-1830-0									
GA-01-R	Radium-226	160-13352-5	SO	1.62	0.3	0.18			pCi/g
N001-SS006-0012-0									
GA-01-R	Radium-226	160-13352-6	SO	4.43	0.68	0.36			pCi/g

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
N001-SS007-0012-0	GA-01-R Radium-226	160-13352-7	SO	1.27	0.29	0.21			pCi/g
N002-SS001-0012-0	GA-01-R Radium-226	160-13352-8	SO	4.13	0.53	0.19			pCi/g
N002-SS002-0012-0	GA-01-R Radium-226	160-13352-9	SO	4.6	0.68	0.34			pCi/g
N002-SS003-0012-0	GA-01-R Radium-226	160-13352-10	SO	1.08	0.22	0.1			pCi/g
N002-SS004-0012-0	GA-01-R Radium-226	160-13352-11	SO	0.87	0.25	0.2			pCi/g
N002-SS005-0012-0	GA-01-R Radium-226	160-13352-12	SO	0.96	0.28	0.25			pCi/g
N002-SS006-2436-0	GA-01-R Radium-226	160-13352-13	SO	0.86	0.23	0.18			pCi/g
N002-TRENCH-0003	GA-01-R Radium-226	160-13352-14	SO	0.3	0.13	0.14			pCi/g
N003-SS001-1022-0	GA-01-R Radium-226	160-13352-15	SO	0.69	0.14	0.06			pCi/g
N003-SS002-2436-0	GA-01-R Radium-226	160-13352-16	SO	0.65	0.2	0.16			pCi/g
N003-SS003-1224-0	GA-01-R Radium-226	160-13352-17	SO	1.1	0.22	0.15			pCi/g
N003-SS003-1224-0	GA-01-R Radium-226	160-13352-18	SO	1.43	0.28	0.17			pCi/g
RB-N-150811	9315 Radium-226	160-13352-19	LI	0.06	0.05	0.08 J+, B+, J,	J+		pCi/L

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
9320 RB-N-150812	Radium-228	160-13352-19	LI	-0.08	0.2	0.37	Q, U	U	pCi/L
160-13352-3									
LABQC									
GA-01-R	Americium-241	LCS 160-206989/	SO	101.2	10.7	1.29			pCi/g
GA-01-R	Cesium-137	LCS 160-206989/	SO	30.01	3.25	0.42	P,		pCi/g
GA-01-R	Cesium-137	MB 160-206989/	SO	0	0.01	0.06	P, Q, U		pCi/g
GA-01-R	Cobalt-60	LCS 160-206989/	SO	18.85	1.97	0.07			pCi/g
GA-01-R	Radium-226	MB 160-206989/	SO	-0.36	1.44	1.22	P, J+, Q, U		pCi/g
GA-01-R	Radium-228	MB 160-206989/	SO	0.04	0.08	0.28	Q, U		pCi/g
N001-SS001-1224-0									
GA-01-R	Ac-228	160-13352-1 DU	SO	1.1	0.27	0.11			pCi/g
GA-01-R	Ac-228	160-13352-1	SO	1.01	0.32	0.17			pCi/g
GA-01-R	Bi-214	160-13352-1 DU	SO	0.84	0.19	0.14	R,	R	pCi/g
GA-01-R	Bi-214	160-13352-1	SO	0.68	0.21	0.17	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-1	SO	0.22	0.09	0.1	P,	J	pCi/g
GA-01-R	Cesium-137	160-13352-1 DU	SO	0.13	0.07	0.07	P,	J	pCi/g
GA-01-R	K-40	160-13352-1	SO	14.9	2.85	1.35			pCi/g
GA-01-R	K-40	160-13352-1 DU	SO	15.99	2.63	1.12			pCi/g
GA-01-R	Pb-212	160-13352-1	SO	0.99	0.24	0.18			pCi/g
GA-01-R	Pb-212	160-13352-1 DU	SO	0.91	0.21	0.16			pCi/g
GA-01-R	Pb-214	160-13352-1 DU	SO	0.93	0.18	0.14	R,	R	pCi/g

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Pb-214	160-13352-1	SO	0.84	0.22	0.15	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-1 DU	SO	2.38	1.24	1.37	P, J+,	J+	pCi/g
GA-01-R	Radium-226	160-13352-1	SO	5.25	1.86	1.56	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-1 DU	SO	1.1	0.27	0.11			pCi/g
GA-01-R	Radium-228	160-13352-1	SO	1.01	0.32	0.17			pCi/g
GA-01-R	Tl-208	160-13352-1	SO	0.38	0.12	0.1			pCi/g
GA-01-R	Tl-208	160-13352-1 DU	SO	0.3	0.09	0.06			pCi/g
N001-SS002-1224-0									
GA-01-R	Ac-228	160-13352-2	SO	0.7	0.2	0.28			pCi/g
GA-01-R	Bi-214	160-13352-2	SO	0.85	0.21	0.16	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-2	SO	0.2	0.07	0.05	P,	J	pCi/g
GA-01-R	K-40	160-13352-2	SO	13.2	2.15	0.8			pCi/g
GA-01-R	Pb-212	160-13352-2	SO	1	0.2	0.14			pCi/g
GA-01-R	Pb-214	160-13352-2	SO	0.99	0.18	0.16	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-2	SO	1.98	1.18	1.73	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-2	SO	0.7	0.2	0.28			pCi/g
GA-01-R	Tl-208	160-13352-2	SO	0.36	0.08	0.04			pCi/g
N001-SS003-0012-0									
GA-01-R	Ac-228	160-13352-3	SO	0.95	0.29	0.23			pCi/g
GA-01-R	Bi-214	160-13352-3	SO	0.96	0.23	0.16	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-3	SO	0.14	0.09	0.14	P,	J	pCi/g
GA-01-R	K-40	160-13352-3	SO	17.7	2.96	0.94			pCi/g
GA-01-R	Pb-212	160-13352-3	SO	1.02	0.24	0.19			pCi/g
GA-01-R	Pb-214	160-13352-3	SO	0.99	0.21	0.2	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-3	SO	3.68	1.72	1.74	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-3	SO	0.95	0.29	0.23			pCi/g

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Tl-208	160-13352-3	SO	0.44	0.11	0.08			pCi/g
N001-SS004-0012-0									
GA-01-R	Ac-228	160-13352-4	SO	1.25	0.37	0.3			pCi/g
GA-01-R	Bi-214	160-13352-4	SO	0.87	0.23	0.2 R,	R		pCi/g
GA-01-R	Cesium-137	160-13352-4	SO	0.05	0.09	0.16 P, Q, U	U		pCi/g
GA-01-R	K-40	160-13352-4	SO	20.4	3.25	1.28			pCi/g
GA-01-R	Pb-212	160-13352-4	SO	1.02	0.22	0.17			pCi/g
GA-01-R	Pb-214	160-13352-4	SO	1.08	0.24	0.18 R,	R		pCi/g
GA-01-R	Radium-226	160-13352-4	SO	3.3	2.26	2.54 P, J+,	J+		pCi/g
GA-01-R	Radium-228	160-13352-4	SO	1.25	0.37	0.3			pCi/g
GA-01-R	Tl-208	160-13352-4	SO	0.49	0.13	0.09			pCi/g
N001-SS005-1830-0									
GA-01-R	Ac-228	160-13352-5	SO	1.28	0.41	0.26			pCi/g
GA-01-R	Bi-214	160-13352-5	SO	1.37	0.3	0.2 R,	R		pCi/g
GA-01-R	Cesium-137	160-13352-5	SO	0.14	0.08	0.1 P,	J		pCi/g
GA-01-R	K-40	160-13352-5	SO	15.6	3.08	1.48			pCi/g
GA-01-R	Pb-212	160-13352-5	SO	1.65	0.32	0.21			pCi/g
GA-01-R	Pb-214	160-13352-5	SO	1.76	0.31	0.24 R,	R		pCi/g
GA-01-R	Radium-226	160-13352-5	SO	3.88	2.21	2.56 P, J+,	J+		pCi/g
GA-01-R	Radium-228	160-13352-5	SO	1.28	0.41	0.26			pCi/g
GA-01-R	Tl-208	160-13352-5	SO	0.5	0.15	0.12			pCi/g
N001-SS006-0012-0									
GA-01-R	Ac-228	160-13352-6	SO	11.5	1.39	0.42			pCi/g
GA-01-R	Bi-212	160-13352-6	SO	13.3	2.45	1.67			pCi/g
GA-01-R	Bi-214	160-13352-6	SO	4.07	0.57	0.24 R,	R		pCi/g
GA-01-R	Cesium-137	160-13352-6	SO	0.28	0.12	0.13 P,	J		pCi/g

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	K-40	160-13352-6	SO	13.5	2.36	1.01			pCi/g
GA-01-R	Pb-212	160-13352-6	SO	12.4	1.7	0.42			pCi/g
GA-01-R	Pb-214	160-13352-6	SO	4.6	0.67	0.38	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-6	SO	11.7	4.38	4.26	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-6	SO	11.5	1.39	0.42			pCi/g
GA-01-R	Tl-208	160-13352-6	SO	4.39	0.55	0.19			pCi/g
N001-SS007-0012-0									
GA-01-R	Ac-228	160-13352-7	SO	0.76	0.22	0.11			pCi/g
GA-01-R	Bi-214	160-13352-7	SO	1.11	0.23	0.16	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-7	SO	0.04	0.06	0.1	P, Q, U	U	pCi/g
GA-01-R	K-40	160-13352-7	SO	13.9	2.29	0.99			pCi/g
GA-01-R	Pb-212	160-13352-7	SO	0.83	0.2	0.17			pCi/g
GA-01-R	Pb-214	160-13352-7	SO	1.42	0.26	0.17	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-7	SO	3.32	1.8	2.03	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-7	SO	0.76	0.22	0.11			pCi/g
GA-01-R	Tl-208	160-13352-7	SO	0.31	0.09	0.07			pCi/g
N002-SS001-0012-0									
GA-01-R	Ac-228	160-13352-8	SO	5.19	0.72	0.37			pCi/g
GA-01-R	Bi-212	160-13352-8	SO	5.81	1.81	1.54			pCi/g
GA-01-R	Bi-214	160-13352-8	SO	4.23	0.62	0.29	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-8	SO	0.07	0.1	0.17	P, Q, U	U	pCi/g
GA-01-R	K-40	160-13352-8	SO	8.53	1.89	1.15			pCi/g
GA-01-R	Pb-212	160-13352-8	SO	5.56	0.81	0.31			pCi/g
GA-01-R	Pb-214	160-13352-8	SO	4.81	0.64	0.34	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-8	SO	9.52	3.39	3.29	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-8	SO	5.19	0.72	0.37			pCi/g

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METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Tl-208	160-13352-8	SO	2.11	0.3	0.11			pCi/g
N002-SS002-0012-0									
GA-01-R	Ac-228	160-13352-9	SO	13.6	1.59	0.29			pCi/g
GA-01-R	Bi-212	160-13352-9	SO	16.1	2.92	1.82			pCi/g
GA-01-R	Bi-214	160-13352-9	SO	4.62	0.74	0.43 R,	R		pCi/g
GA-01-R	Cesium-137	160-13352-9	SO	0.06	0.14	0.24 P, Q, U	U		pCi/g
GA-01-R	K-40	160-13352-9	SO	15.9	2.77	1.13			pCi/g
GA-01-R	Pb-212	160-13352-9	SO	13.6	1.83	0.42			pCi/g
GA-01-R	Pb-214	160-13352-9	SO	4.58	0.67	0.48 R,	R		pCi/g
GA-01-R	Radium-226	160-13352-9	SO	14	5.23	4.91 P, J+,	J+		pCi/g
GA-01-R	Radium-228	160-13352-9	SO	13.6	1.59	0.29			pCi/g
GA-01-R	Tl-208	160-13352-9	SO	5.01	0.61	0.19			pCi/g
N002-SS003-0012-0									
GA-01-R	Ac-228	160-13352-10	SO	1.42	0.3	0.09			pCi/g
GA-01-R	Bi-212	160-13352-10	SO	1.93	0.59	0.29			pCi/g
GA-01-R	Bi-214	160-13352-10	SO	0.93	0.21	0.15 R,	R		pCi/g
GA-01-R	Cesium-137	160-13352-10	SO	0	0.05	0.09 P, Q, U	U		pCi/g
GA-01-R	K-40	160-13352-10	SO	17	2.57	0.91			pCi/g
GA-01-R	Pb-212	160-13352-10	SO	1.14	0.23	0.15			pCi/g
GA-01-R	Pb-214	160-13352-10	SO	0.89	0.18	0.16 R,	R		pCi/g
GA-01-R	Radium-226	160-13352-10	SO	4.27	1.98	1.75 P, J+,	J+		pCi/g
GA-01-R	Radium-228	160-13352-10	SO	1.42	0.3	0.09			pCi/g
GA-01-R	Tl-208	160-13352-10	SO	0.46	0.1	0.05			pCi/g
N002-SS004-0012-0									
GA-01-R	Ac-228	160-13352-11	SO	1.37	0.32	0.14			pCi/g
GA-01-R	Bi-212	160-13352-11	SO	2.29	0.98	0.78			pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Bi-214	160-13352-11	SO	0.93	0.25	0.2	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-11	SO	0.26	0.09	0.07	P,	J	pCi/g
GA-01-R	K-40	160-13352-11	SO	19.3	3.15	0.95			pCi/g
GA-01-R	Pb-212	160-13352-11	SO	1.12	0.27	0.22			pCi/g
GA-01-R	Pb-214	160-13352-11	SO	0.94	0.22	0.21	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-11	SO	5.03	2.17	2.02	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-11	SO	1.37	0.32	0.14			pCi/g
GA-01-R	Tl-208	160-13352-11	SO	0.4	0.12	0.1			pCi/g
N002-SS005-0012-0									
GA-01-R	Ac-228	160-13352-12	SO	0.72	0.29	0.46			pCi/g
GA-01-R	Bi-214	160-13352-12	SO	0.96	0.26	0.24	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-12	SO	0.02	0.07	0.13	P, Q, U	U	pCi/g
GA-01-R	K-40	160-13352-12	SO	15.6	3	2.1			pCi/g
GA-01-R	Pb-212	160-13352-12	SO	1.08	0.26	0.21			pCi/g
GA-01-R	Pb-214	160-13352-12	SO	0.94	0.26	0.24	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-12	SO	3.2	2.52	2.92	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-12	SO	0.72	0.29	0.46			pCi/g
GA-01-R	Tl-208	160-13352-12	SO	0.41	0.12	0.11			pCi/g
N002-SS006-2436-0									
GA-01-R	Ac-228	160-13352-13	SO	1	0.32	0.17			pCi/g
GA-01-R	Bi-214	160-13352-13	SO	0.63	0.21	0.2	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-13	SO	-0.01	0.13	0.13	P, Q, U	U	pCi/g
GA-01-R	K-40	160-13352-13	SO	12.9	2.59	1.17			pCi/g
GA-01-R	Pb-212	160-13352-13	SO	0.9	0.22	0.17			pCi/g
GA-01-R	Pb-214	160-13352-13	SO	0.71	0.2	0.2	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-13	SO	1.58	1.25	2	P, J+, J,	J+	pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Radium-228	160-13352-13	SO	1	0.32	0.17			pCi/g
GA-01-R	Tl-208	160-13352-13	SO	0.31	0.1	0.06			pCi/g
N002-TRENCH-0003									
GA-01-R	Cesium-137	160-13352-14	SO	0.01	0.03	0.06	P, Q, U	U	pCi/g
GA-01-R	K-40	160-13352-14	SO	0.89	0.61	0.98	J,	J	pCi/g
GA-01-R	Pb-212	160-13352-14	SO	0.16	0.06	0.06			pCi/g
GA-01-R	Pb-214	160-13352-14	SO	0.29	0.1	0.08	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-14	SO	0.08	0.56	1	P, J+, Q, U	U	pCi/g
GA-01-R	Radium-228	160-13352-14	SO	0.15	0.13	0.23	J,	J	pCi/g
GA-01-R	Tl-208	160-13352-14	SO	0.06	0.03	0.04			pCi/g
N003-SS001-1022-0									
GA-01-R	Ac-228	160-13352-15	SO	0.36	0.12	0.17			pCi/g
GA-01-R	Bi-212	160-13352-15	SO	1.05	0.45	0.33			pCi/g
GA-01-R	Bi-214	160-13352-15	SO	0.76	0.15	0.1	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-15	SO	-0.01	0.04	0.06	P, Q, U	U	pCi/g
GA-01-R	K-40	160-13352-15	SO	3.55	0.86	0.72			pCi/g
GA-01-R	Pb-212	160-13352-15	SO	0.46	0.13	0.1			pCi/g
GA-01-R	Pb-214	160-13352-15	SO	0.67	0.14	0.09	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-15	SO	2.86	1.18	1	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-15	SO	0.36	0.12	0.17			pCi/g
GA-01-R	Tl-208	160-13352-15	SO	0.25	0.06	0.04			pCi/g
N003-SS002-2436-0									
GA-01-R	Ac-228	160-13352-16	SO	0.84	0.2	0.16			pCi/g
GA-01-R	Bi-212	160-13352-16	SO	1.41	0.52	0.32			pCi/g
GA-01-R	Bi-214	160-13352-16	SO	0.59	0.18	0.16	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-16	SO	0.02	0.04	0.08	P, Q, U	U	pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	K-40	160-13352-16	SO	14.8	2.34	0.66			pCi/g
GA-01-R	Pb-212	160-13352-16	SO	0.62	0.15	0.13			pCi/g
GA-01-R	Pb-214	160-13352-16	SO	0.73	0.17	0.18	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-16	SO	3.06	1.55	1.59	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-16	SO	0.84	0.2	0.16			pCi/g
GA-01-R	Tl-208	160-13352-16	SO	0.26	0.07	0.06			pCi/g
N003-SS003-1224-0									
GA-01-R	Ac-228	160-13352-17	SO	2.42	0.47	0.17			pCi/g
GA-01-R	Bi-212	160-13352-17	SO	3.15	1.37	1.13			pCi/g
GA-01-R	Bi-214	160-13352-17	SO	1.32	0.27	0.18	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-17	SO	0.06	0.07	0.11	P, J,	J	pCi/g
GA-01-R	K-40	160-13352-17	SO	11.1	2.05	1.15			pCi/g
GA-01-R	Pb-212	160-13352-17	SO	2.1	0.37	0.23			pCi/g
GA-01-R	Pb-214	160-13352-17	SO	1.32	0.29	0.21	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-17	SO	3.19	1.8	2.12	P, J+,	J+	pCi/g
GA-01-R	Radium-228	160-13352-17	SO	2.42	0.47	0.17			pCi/g
GA-01-R	Tl-208	160-13352-17	SO	0.82	0.14	0.06			pCi/g
N003-SS003-1224-0									
GA-01-R	Ac-228	160-13352-18	SO	2.17	0.48	0.25			pCi/g
GA-01-R	Bi-212	160-13352-18	SO	2.69	0.97	0.67			pCi/g
GA-01-R	Bi-214	160-13352-18	SO	1.13	0.29	0.21	R,	R	pCi/g
GA-01-R	Cesium-137	160-13352-18	SO	0.07	0.07	0.1	P, J,	J	pCi/g
GA-01-R	K-40	160-13352-18	SO	8.09	2.05	1.78			pCi/g
GA-01-R	Pb-212	160-13352-18	SO	2.2	0.38	0.2			pCi/g
GA-01-R	Pb-214	160-13352-18	SO	1.06	0.24	0.19	R,	R	pCi/g
GA-01-R	Radium-226	160-13352-18	SO	4.87	2.39	2.47	P, J+,	J+	pCi/g

Data Package #

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Radium-228	160-13352-18	SO	2.17	0.48	0.25			pCi/g
GA-01-R	Tl-208	160-13352-18	SO	0.8	0.18	0.11			pCi/g

Radiological Data Verification/Validation Checklist

Site Name: Niagara Falls Boulevard Site _____ Analytical Laboratory _____ TestAmerica Laboratories

Case Number _____ * _____ Reviewer _____ Rick Haaker, CHP, CIH _____ Date _____ January 8, 2016 _____
RF Haaker

Part 1 - Sample Handling and Analysis Evaluation

MARLAP Ref.	Criteria	Yes	No	NA	Comments
8.5.1.1	Sample Descriptors - Each sample has a unique ID code which is cross-reference to unique Lab ID	X			
8.5.1.2	Aliquant Size - amount of sample used in analysis provided	X			
8.5.1.3	Dates of sample collection, sample prep and sample analysis provided	X			
8.5.1.4	Samples properly preserved	X			
8.5.1.5	Each analytical result linked to instrument/detector	X			
8.5.1.6	Traceability of standards and reference materials provided	X			
8.5.1.7	QC samples analyzed	X			
8.5.1.8	Yield (chemical separation, carrier and/or radiotracer) within acceptable ranges	X			
8.5.1.9	Self-absorption curve provided	X			Curves provided for Ra-226 & Ra-228 by gas flow proportional counting.
8.5.1.10	Efficiency, calibration curves and instrument background information provided	X			
8.5.1.11	Spectrometry resolution data provided	X			
8.5.1.12	Dilution factors and corrections factors addressed and documentation provided.	X			Provided in data packages but not reviewed in detail by the validator.
8.5.1.13	Count Time for each sample, QC analysis and instrument background provided	X			
8.5.1.14	For each measurement:				
	1) Measurement uncertainty reported	X			
	2) Analyte MDC reported	X			
	3) Appropriate units used	X			

* Covers Test America Data Packages: 160-13352-1, 160-13352-2 & 160-13352-3

Part 2 - Quality Control

MARLAP Ref.	Criteria	Yes	No	NA	Comments
8.5.2.1	Method Blanks analyzed and no detected concentration/activity found		X		See section 6A of the validation report for detections in the method blanks.
8.5.2.2	Laboratory Control Samples analyzed and within acceptable ranges	X			
8.5.2.3	Laboratory replicates analyzed and within control limits	X			
8.5.2.4	Matrix Spikes/Matrix Spike Duplicate analyzed and within established criteria			X	Matrix spikes were analyzed. MS duplicates were or matrix spike duplicates were not required by the field sampling plan.
8.5.3.1	Test of detection information (critical value) provided.			X	The MDC was provided based on alpha = beta = 0.05. The critical value was not required by QAPP. The critical level can be approximated as 50% of the MDC. It can be calculated from the data provided in the package.
8.5.3.2	Detection Capability: Required Minimum Detectable Concentration (RMDC) less than the Minimum Detectable Concentration (MDC) for each analyte		X		The required MDC for radium-226 by gamma spectroscopy utilizing the 186 kev line did not always meet the required detection limit of 1 pCi/g. This analysis was requested for a quick radium-226 estimate.
8.5.3.3	Uncertainty 1. Laboratory's combined standard uncertainty at concentrations lower than the action level less than required method uncertainty (expressed in concentration units) 2. Laboratory's relative combined standard uncertainty at concentrations above the action level less than required relative method uncertainty (express as a percent)			X X	No precision criteria was specified in the QAPP for individual analytical results.

Additional Comments: Lead-214 and bismuth-214 determined on 3-day ingrowth samples by gamma spectroscopy have a low bias and were rejected. Rinse blanks had detected activity, see section 6F for additional detail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 160-13352-1



Job Description: EPA RST2 - RFP No. 337

For:

Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837

Attention: Ms. Smita Sumbaly

Elizabeth M. Hoercher

Approved for release,
Elizabeth M Hoercher
Project Mgmt. Assistant
8/27/2015 3:55 PM

Designee for
Rhonda E Ridenhower, Manager of Project Management
13715 Rider Trail North, Earth City, MO, 63045
rhonda.ridenhower@testamericainc.com
08/27/2015

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North, Earth City, MO 63045
Tel (314) 298-8566 Fax (314) 298-8757 www.testamericainc.com

ANALYTICAL REPORT

Job Number: 160-13352-2

Job Description: EPA RST2 - RFP No. 337

For:

Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837

Attention: Ms. Smita Sumbaly



Approved for release.
Rhonda E Ridenhower
Manager of Project Management
9/10/2015 2:04 PM

Rhonda E Ridenhower, Manager of Project Management
13715 Rider Trail North, Earth City, MO, 63045
rhonda.ridenhower@testamericainc.com
09/10/2015

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager.

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

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Definitions/Glossary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Weston Solutions, Inc.

Project: EPA RST2 - RFP No. 337

Report Number: 160-13352-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 08/14/2015; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 3.2° C, 4.5° C, 4.7° C and 5.3° C

RADIUM 226 (21 DAY INGROWTH)

Samples RB-N-150811 (160-13352-19) and RB-N-150812 (160-13352-20) were analyzed for Radium 226 (21 day ingrowth) in accordance with SW- 846 Method 9315. The samples were prepared on 08/17/2015 and analyzed on 09/08/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-228 (GFPC)

Samples RB-N-150811 (160-13352-19) and RB-N-150812 (160-13352-20) were analyzed for Radium-228 (GFPC) in accordance with SW-846 Method 9320. The samples were prepared on 08/17/2015 and analyzed on 09/02/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples N001-SS001-1224-01 (160-13352-1), N001-SS002-1224-01 (160-13352-2), N001-SS003-0012-01 (160-13352-3), N001-SS004-0012-01 (160-13352-4), N001-SS005-1830-01 (160-13352-5), N001-SS006-0012-01 (160-13352-6), N001-SS007-0012-01 (160-13352-7), N002-SS001-0012-01 (160-13352-8), N002-SS002-0012-01 (160-13352-9), N002-SS003-0012-01 (160-13352-10), N002-SS004-0012-01 (160-13352-11), N002-SS005-0012-01 (160-13352-12), N002-SS006-2436-01 (160-13352-13), N002-TRENCH-0003-01 (160-13352-14), N003-SS001-1022-01 (160-13352-15), N003-SS002-2436-01 (160-13352-16), N003-SS003-1224-01 (160-13352-17) and N003-SS003-1224-02 (160-13352-18) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 08/15/2015, prepared on 08/19/2015 and analyzed on 09/09/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N001-SS001-1224-01

Lab Sample ID: 160-13352-1

Matrix: Solid

Date Collected: 08/11/15 13:55

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.856		0.214	0.232	1.00	0.168	pCi/g	08/19/15 12:18	09/09/15 07:40	1

Client Sample ID: N001-SS002-1224-01

Lab Sample ID: 160-13352-2

Matrix: Solid

Date Collected: 08/11/15 14:21

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.711		0.157	0.174	1.00	0.139	pCi/g	08/19/15 12:18	09/09/15 07:41	1

Client Sample ID: N001-SS003-0012-01

Lab Sample ID: 160-13352-3

Matrix: Solid

Date Collected: 08/11/15 14:50

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.962		0.231	0.252	1.00	0.199	pCi/g	08/19/15 12:18	09/09/15 07:41	1

Client Sample ID: N001-SS004-0012-01

Lab Sample ID: 160-13352-4

Matrix: Solid

Date Collected: 08/11/15 15:00

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	1.13		0.255	0.281	1.00	0.174	pCi/g	08/19/15 12:18	09/09/15 07:44	1

Client Sample ID: N001-SS005-1830-01

Lab Sample ID: 160-13352-5

Matrix: Solid

Date Collected: 08/11/15 15:26

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	1.62		0.249	0.300	1.00	0.183	pCi/g	08/19/15 12:18	09/09/15 08:15	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N001-SS006-0012-01

Lab Sample ID: 160-13352-6

Matrix: Solid

Date Collected: 08/12/15 15:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	4.43		0.501	0.681	1.00	0.364	pCi/g	08/19/15 12:18	09/09/15 08:14	1

Client Sample ID: N001-SS007-0012-01

Lab Sample ID: 160-13352-7

Matrix: Solid

Date Collected: 08/12/15 15:15

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	1.27		0.259	0.291	1.00	0.213	pCi/g	08/19/15 12:18	09/09/15 08:17	1

Client Sample ID: N002-SS001-0012-01

Lab Sample ID: 160-13352-8

Matrix: Solid

Date Collected: 08/11/15 13:10

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	4.13		0.304	0.526	1.00	0.186	pCi/g	08/19/15 12:18	09/09/15 08:18	1

Client Sample ID: N002-SS002-0012-01

Lab Sample ID: 160-13352-9

Matrix: Solid

Date Collected: 08/11/15 13:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	4.60		0.488	0.683	1.00	0.341	pCi/g	08/19/15 12:18	09/09/15 08:19	1

Client Sample ID: N002-SS003-0012-01

Lab Sample ID: 160-13352-10

Matrix: Solid

Date Collected: 08/11/15 16:45

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	1.08		0.191	0.222	1.00	0.102	pCi/g	08/19/15 12:18	09/09/15 08:20	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N002-SS004-0012-01

Lab Sample ID: 160-13352-11

Matrix: Solid

Date Collected: 08/11/15 17:00

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.867		0.230	0.247	1.00	0.202	pCi/g	08/19/15 12:18	09/09/15 08:21	1

Client Sample ID: N002-SS005-0012-01

Lab Sample ID: 160-13352-12

Matrix: Solid

Date Collected: 08/11/15 15:58

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.956		0.262	0.280	1.00	0.252	pCi/g	08/19/15 12:18	09/09/15 08:19	1

Client Sample ID: N002-SS006-2436-01

Lab Sample ID: 160-13352-13

Matrix: Solid

Date Collected: 08/11/15 16:25

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.857		0.209	0.227	1.00	0.185	pCi/g	08/19/15 12:18	09/09/15 08:52	1

Client Sample ID: N002-TRENCH-0003-01

Lab Sample ID: 160-13352-14

Matrix: Solid

Date Collected: 08/13/15 08:05

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.301		0.125	0.129	1.00	0.142	pCi/g	08/19/15 12:18	09/09/15 08:53	1

Client Sample ID: N003-SS001-1022-01

Lab Sample ID: 160-13352-15

Matrix: Solid

Date Collected: 08/11/15 11:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.689		0.123	0.142	1.00	0.0574	pCi/g	08/19/15 12:18	09/09/15 08:54	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N003-SS002-2436-01

Lab Sample ID: 160-13352-16

Matrix: Solid

Date Collected: 08/11/15 11:45

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.649		0.186	0.198	1.00	0.163	pCi/g	08/19/15 12:18	09/09/15 08:55	1

Client Sample ID: N003-SS003-1224-01

Lab Sample ID: 160-13352-17

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	1.10		0.189	0.221	1.00	0.148	pCi/g	08/19/15 12:18	09/09/15 08:51	1

Client Sample ID: N003-SS003-1224-02

Lab Sample ID: 160-13352-18

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	1.43		0.237	0.280	1.00	0.170	pCi/g	08/19/15 12:18	09/09/15 08:52	1

Client Sample ID: RB-N-150811

Lab Sample ID: 160-13352-19

Matrix: Water

Date Collected: 08/11/15 19:30

Date Received: 08/14/15 13:25

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.0639	U	0.0532	0.0535	1.00	0.0805	pCi/L	08/17/15 12:43	09/08/15 07:11	1
<i>Carrier</i>	% Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110					08/17/15 12:43	09/08/15 07:11	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	-0.0816	U	0.201	0.201	1.00	0.367	pCi/L	08/17/15 12:53	09/02/15 11:49	1
<i>Carrier</i>	% Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110					08/17/15 12:53	09/02/15 11:49	1
Y Carrier	97.2		40 - 110					08/17/15 12:53	09/02/15 11:49	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: RB-N-150812

Lab Sample ID: 160-13352-20

Matrix: Water

Date Collected: 08/12/15 15:45

Date Received: 08/14/15 13:25

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.0169	U	0.0558	0.0558	1.00	0.101	pCi/L	08/17/15 12:43	09/08/15 07:12	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Ba Carrier	98.8		40 - 110					08/17/15 12:43	09/08/15 07:12	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	-0.0300	U	0.203	0.203	1.00	0.364	pCi/L	08/17/15 12:53	09/02/15 11:49	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Ba Carrier	98.8		40 - 110					08/17/15 12:53	09/02/15 11:49	1
Y Carrier	96.8		40 - 110					08/17/15 12:53	09/02/15 11:49	1

Tracer/Carrier Summary

Client: Weston Solutions, Inc.

TestAmerica Job ID: 160-13352-2

Project/Site: EPA RST2 - RFP No. 337

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Ba (40-110)	
160-13352-19	RB-N-150811	102	
160-13352-20	RB-N-150812	98.8	
160-13352-20 DU	RB-N-150812	104	
LCS 160-206049/2-A	Lab Control Sample	93.8	
MB 160-206049/1-A	Method Blank	108	

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Ba (40-110)	Y (40-110)
160-13352-19	RB-N-150811	102	97.2
160-13352-20	RB-N-150812	98.8	96.8
160-13352-20 DU	RB-N-150812	104	92.7
LCS 160-206051/2-A	Lab Control Sample	93.8	97.2
MB 160-206051/1-A	Method Blank	108	95.0

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

QC Sample Results

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-206049/1-A

Matrix: Water

Analysis Batch: 209746

Analyte	Result	MB MB MB	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.04599	U		0.0533	0.0535	1.00	0.0873	pCi/L	08/17/15 12:43	09/08/15 07:11	1
Carrier		MB MB MB		%Yield	Qualifier	Limits			Prepared	Analyzed	Dil Fac
Ba Carrier		108				40 - 110			08/17/15 12:43	09/08/15 07:11	1

Lab Sample ID: LCS 160-206049/2-A

Matrix: Water

Analysis Batch: 209746

Analyte	Spike Added	LCS Result	LCS Qual	Count	Total	RL	MDC	Unit	%Rec	%Rec. Limits	
				Uncert. (2σ+/-)	(2σ+/-)						
Radium-226	11.2	12.61		1.24	1.24	1.00	0.115	pCi/L	113	68 - 137	
Carrier		LCS LCS LCS		%Yield	Qualifier	Limits					
Ba Carrier		93.8				40 - 110					

Lab Sample ID: 160-13352-20 DU

Matrix: Water

Analysis Batch: 209746

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Count	Total	RL	MDC	Unit	RER	RER Limit
					Uncert. (2σ+/-)	(2σ+/-)					
Radium-226	0.0169	U	-0.00706	U	0.0590	0.0590	1.00	0.112	pCi/L	0.21	1
Carrier		DU DU DU		%Yield	Qualifier	Limits					
Ba Carrier		104				40 - 110					

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-206051/1-A

Matrix: Water

Analysis Batch: 209120

Analyte	Result	MB MB MB	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	(2σ+/-)						
Radium-228	-0.02918	U		0.191	0.191	1.00	0.342	pCi/L	08/17/15 12:53	09/02/15 11:49	1
Carrier		MB MB MB		%Yield	Qualifier	Limits			Prepared	Analyzed	Dil Fac
Ba Carrier		108				40 - 110			08/17/15 12:53	09/02/15 11:49	1
Y Carrier		95.0				40 - 110			08/17/15 12:53	09/02/15 11:49	1

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 206051

QC Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Method: 9320 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-206051/2-A

Matrix: Water

Analysis Batch: 209120

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 206051

Analyte	Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	%Rec.
	Added	Result	Qual	Uncert. (2σ+/-)					
Radium-228	3.30	2.458		0.426	1.00	0.355	pCi/L	74	56 - 140
<hr/>									
Carrier									
<i>LCS</i> <i>LCS</i>									
<i>%Yield</i> <i>Qualifier</i>									
<i>Limits</i>									
Ba Carrier	93.8			40 - 110					
Y Carrier	97.2			40 - 110					

Lab Sample ID: 160-13352-20 DU

Matrix: Water

Analysis Batch: 209120

Client Sample ID: RB-N-150812

Prep Type: Total/NA

Prep Batch: 206051

Analyte	Sample	Sample	DU	DU	Total	RL	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Radium-228	-0.0300	U	-0.1170	U	0.172	1.00	0.327	pCi/L	0.23	1
<hr/>										
Carrier										
<i>DU</i> <i>DU</i>										
<i>%Yield</i> <i>Qualifier</i>										
<i>Limits</i>										
Ba Carrier	104		40 - 110							
Y Carrier	92.7		40 - 110							

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-206493/1-A

Matrix: Solid

Analysis Batch: 210004

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 206493

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.06232	U	1.11	1.11	1.00	0.159	pCi/g	08/19/15 12:18	09/09/15 07:38	1

Lab Sample ID: LCS 160-206493/2-A

Matrix: Solid

Analysis Batch: 210003

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 206493

Analyte	Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	%Rec.
	Added	Result	Qual	Uncert. (2σ+/-)					
Americium-241	97.2	97.53		10.2		1.17	pCi/g	100	87 - 116
Cesium-137	30.2	30.36		3.23		0.256	pCi/g	101	87 - 120
Cobalt-60	18.9	19.06		1.96		0.0973	pCi/g	101	87 - 115

Lab Sample ID: 160-13352-1 DU

Matrix: Solid

Analysis Batch: 210004

Client Sample ID: N001-SS001-1224-01

Prep Type: Total/NA

Prep Batch: 206493

Analyte	Sample	Sample	DU	DU	Total	RL	MDC	Unit	%Rec	RER
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Radium-226	0.856		1.077		0.262	1.00	0.190	pCi/g	0.45	1

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.

TestAmerica Job ID: 160-13352-2

Project/Site: EPA RST2 - RFP No. 337

Rad

Leach Batch: 205721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-1	N001-SS001-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-1 DU	N001-SS001-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-2	N001-SS002-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-3	N001-SS003-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-4	N001-SS004-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-5	N001-SS005-1830-01	Total/NA	Solid	Dry and Grind	
160-13352-6	N001-SS006-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-7	N001-SS007-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-8	N002-SS001-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-9	N002-SS002-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-10	N002-SS003-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-11	N002-SS004-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-12	N002-SS005-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-13	N002-SS006-2436-01	Total/NA	Solid	Dry and Grind	
160-13352-14	N002-TRENCH-0003-01	Total/NA	Solid	Dry and Grind	
160-13352-15	N003-SS001-1022-01	Total/NA	Solid	Dry and Grind	
160-13352-16	N003-SS002-2436-01	Total/NA	Solid	Dry and Grind	
160-13352-17	N003-SS003-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-18	N003-SS003-1224-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 206049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-19	RB-N-150811	Total/NA	Water	PrecSep-21	
160-13352-20	RB-N-150812	Total/NA	Water	PrecSep-21	
160-13352-20 DU	RB-N-150812	Total/NA	Water	PrecSep-21	
LCS 160-206049/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
MB 160-206049/1-A	Method Blank	Total/NA	Water	PrecSep-21	

Prep Batch: 206051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-19	RB-N-150811	Total/NA	Water	PrecSep_0	
160-13352-20	RB-N-150812	Total/NA	Water	PrecSep_0	
160-13352-20 DU	RB-N-150812	Total/NA	Water	PrecSep_0	
LCS 160-206051/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
MB 160-206051/1-A	Method Blank	Total/NA	Water	PrecSep_0	

Prep Batch: 206493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-1	N001-SS001-1224-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-1 DU	N001-SS001-1224-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-2	N001-SS002-1224-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-3	N001-SS003-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-4	N001-SS004-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-5	N001-SS005-1830-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-6	N001-SS006-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-7	N001-SS007-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-8	N002-SS001-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-9	N002-SS002-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-10	N002-SS003-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-11	N002-SS004-0012-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-12	N002-SS005-0012-01	Total/NA	Solid	Fill_Geo-21	205721

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.

TestAmerica Job ID: 160-13352-2

Project/Site: EPA RST2 - RFP No. 337

Rad (Continued)

Prep Batch: 206493 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-13	N002-SS006-2436-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-14	N002-TRENCH-0003-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-15	N003-SS001-1022-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-16	N003-SS002-2436-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-17	N003-SS003-1224-01	Total/NA	Solid	Fill_Geo-21	205721
160-13352-18	N003-SS003-1224-02	Total/NA	Solid	Fill_Geo-21	205721
LCS 160-206493/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-206493/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N001-SS001-1224-01

Date Collected: 08/11/15 13:55

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210002	09/09/15 07:40	ALS	TAL SL

Client Sample ID: N001-SS002-1224-01

Date Collected: 08/11/15 14:21

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210008	09/09/15 07:41	ALS	TAL SL

Client Sample ID: N001-SS003-0012-01

Date Collected: 08/11/15 14:50

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210006	09/09/15 07:41	ALS	TAL SL

Client Sample ID: N001-SS004-0012-01

Date Collected: 08/11/15 15:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209999	09/09/15 07:44	ALS	TAL SL

Client Sample ID: N001-SS005-1830-01

Date Collected: 08/11/15 15:26

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210003	09/09/15 08:15	ALS	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N001-SS006-0012-01

Date Collected: 08/12/15 15:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210002	09/09/15 08:14	ALS	TAL SL

Client Sample ID: N001-SS007-0012-01

Date Collected: 08/12/15 15:15

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210006	09/09/15 08:17	ALS	TAL SL

Client Sample ID: N002-SS001-0012-01

Date Collected: 08/11/15 13:10

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210008	09/09/15 08:18	ALS	TAL SL

Client Sample ID: N002-SS002-0012-01

Date Collected: 08/11/15 13:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209999	09/09/15 08:19	ALS	TAL SL

Client Sample ID: N002-SS003-0012-01

Date Collected: 08/11/15 16:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209998	09/09/15 08:20	ALS	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N002-SS004-0012-01

Lab Sample ID: 160-13352-11

Matrix: Solid

Date Collected: 08/11/15 17:00

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210000	09/09/15 08:21	ALS	TAL SL

Client Sample ID: N002-SS005-0012-01

Lab Sample ID: 160-13352-12

Matrix: Solid

Date Collected: 08/11/15 15:58

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209997	09/09/15 08:19	ALS	TAL SL

Client Sample ID: N002-SS006-2436-01

Lab Sample ID: 160-13352-13

Matrix: Solid

Date Collected: 08/11/15 16:25

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209997	09/09/15 08:52	ALS	TAL SL

Client Sample ID: N002-TRENCH-0003-01

Lab Sample ID: 160-13352-14

Matrix: Solid

Date Collected: 08/13/15 08:05

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210000	09/09/15 08:53	ALS	TAL SL

Client Sample ID: N003-SS001-1022-01

Lab Sample ID: 160-13352-15

Matrix: Solid

Date Collected: 08/11/15 11:30

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209998	09/09/15 08:54	ALS	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Client Sample ID: N003-SS002-2436-01

Lab Sample ID: 160-13352-16

Matrix: Solid

Date Collected: 08/11/15 11:45

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209999	09/09/15 08:55	ALS	TAL SL

Client Sample ID: N003-SS003-1224-01

Lab Sample ID: 160-13352-17

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210008	09/09/15 08:51	ALS	TAL SL

Client Sample ID: N003-SS003-1224-02

Lab Sample ID: 160-13352-18

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206493	08/19/15 12:18	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210006	09/09/15 08:52	ALS	TAL SL

Client Sample ID: RB-N-150811

Lab Sample ID: 160-13352-19

Matrix: Water

Date Collected: 08/11/15 19:30

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			206049	08/17/15 12:43	JAC	TAL SL
Total/NA	Analysis	9315			209746	09/08/15 07:11	CDH	TAL SL
Total/NA	Prep	PrecSep_0			206051	08/17/15 12:53	CMC	TAL SL
Total/NA	Analysis	9320		1	209120	09/02/15 11:49	MFM	TAL SL

Client Sample ID: RB-N-150812

Lab Sample ID: 160-13352-20

Matrix: Water

Date Collected: 08/12/15 15:45

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			206049	08/17/15 12:43	JAC	TAL SL
Total/NA	Analysis	9315			209746	09/08/15 07:12	CDH	TAL SL
Total/NA	Prep	PrecSep_0			206051	08/17/15 12:53	CMC	TAL SL
Total/NA	Analysis	9320		1	209120	09/02/15 11:49	MFM	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica St. Louis

Certification Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Laboratory: TestAmerica St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Louisiana	NELAP	6	04080	06-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
GA-01-R	Fill_Geo-21	Solid	Radium-226
New Jersey	NELAP	2	MO002
			09-30-1

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9315	PrecSep-21	Water	Radium-226

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
9320	PrecSep_0	Water	Radium-228
GA-01-R	Fill_Geo-21	Solid	Radium-226

* Certification renewal pending - certification considered valid.

Method Summary

Client: Weston Solutions, Inc.

TestAmerica Job ID: 160-13352-2

Project/Site: EPA RST2 - RFP No. 337

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13352-1	N001-SS001-1224-01	Solid	08/11/15 13:55	08/14/15 13:25
160-13352-2	N001-SS002-1224-01	Solid	08/11/15 14:21	08/14/15 13:25
160-13352-3	N001-SS003-0012-01	Solid	08/11/15 14:50	08/14/15 13:25
160-13352-4	N001-SS004-0012-01	Solid	08/11/15 15:00	08/14/15 13:25
160-13352-5	N001-SS005-1830-01	Solid	08/11/15 15:26	08/14/15 13:25
160-13352-6	N001-SS006-0012-01	Solid	08/12/15 15:30	08/14/15 13:25
160-13352-7	N001-SS007-0012-01	Solid	08/12/15 15:15	08/14/15 13:25
160-13352-8	N002-SS001-0012-01	Solid	08/11/15 13:10	08/14/15 13:25
160-13352-9	N002-SS002-0012-01	Solid	08/11/15 13:30	08/14/15 13:25
160-13352-10	N002-SS003-0012-01	Solid	08/11/15 16:45	08/14/15 13:25
160-13352-11	N002-SS004-0012-01	Solid	08/11/15 17:00	08/14/15 13:25
160-13352-12	N002-SS005-0012-01	Solid	08/11/15 15:58	08/14/15 13:25
160-13352-13	N002-SS006-2436-01	Solid	08/11/15 16:25	08/14/15 13:25
160-13352-14	N002-TRENCH-0003-01	Solid	08/13/15 08:05	08/14/15 13:25
160-13352-15	N003-SS001-1022-01	Solid	08/11/15 11:30	08/14/15 13:25
160-13352-16	N003-SS002-2436-01	Solid	08/11/15 11:45	08/14/15 13:25
160-13352-17	N003-SS003-1224-01	Solid	08/11/15 12:30	08/14/15 13:25
160-13352-18	N003-SS003-1224-02	Solid	08/11/15 12:30	08/14/15 13:25
160-13352-19	RB-N-150811	Water	08/11/15 19:30	08/14/15 13:25
160-13352-20	RB-N-150812	Water	08/12/15 15:45	08/14/15 13:25

TestAmerica St. Louis

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis

Job No.: 160-13352-2

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration			
					Reagent ID	Volume Added					
Ba_Carrier_00013	06/19/16		CPI, Lot 15F100		(Purchased Reagent)		Ba Carrier	20000 ug/mL			
Marn_Soil_00002	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	2870 Bq			
							Cd-109	39231 Bq			
							Ce-139	1302 Bq			
							Cesium-137	1087 Bq			
							Co-57	849 Bq			
							Cobalt-60	1788 Bq			
							Hg-203	2820 Bq			
							Pb-210	35040 Bq			
							Sn-113	2306 Bq			
							Y-88	3762 Bq			
MarnSolid_00002	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	2797 Bq			
							Cd-109	39337 Bq			
							Ce-139	1320 Bq			
							Cesium-137	1122 Bq			
							Co-57	870 Bq			
							Hg-203	2814 Bq			
							Pb-210	35883 Bq			
							Sn-113	2322 Bq			
							Y-88	3821 Bq			
Ra-226_00008	09/21/13	08/28/12	1M HNO3, Lot 0	1000 mL	Ra-226_00003	3 mL	Ra	25.0433 dpm/mL			
							Radium-226	25.0433 dpm/mL			
							Total Alpha Emitting Radium Isotopes	25.0433 dpm/mL			
.Ra-226_00003	09/09/41	03/07/03	1M HNO3, Lot 0	100 mL	Ra-226_00001	5.0931 g	Ra	8347.78 dpm/mL			
							Radium-226	8347.78 dpm/mL			
							Total Alpha Emitting Radium Isotopes	8347.78 dpm/mL			
..Ra-226_00001	09/09/41	NIST, Lot SRM 4967			(Purchased Reagent)		Ra	2729 Bq/g			
							Radium-226	2729 Bq/g			
							Total Alpha Emitting Radium Isotopes	2729 Bq/g			
Ra-226_00014	11/04/15	10/10/13	1M HNO3, Lot n/a	1000 mL	Ra-226_00003	3 mL	Ra	25.0433 dpm/mL			
							Radium-226	25.0433 dpm/mL			
							Total Alpha Emitting Radium Isotopes	25.0433 dpm/mL			
.Ra-226_00003	09/09/41	03/07/03	1M HNO3, Lot 0	100 mL	Ra-226_00001	5.0931 g	Ra	8347.78 dpm/mL			
							Radium-226	8347.78 dpm/mL			
							Total Alpha Emitting Radium Isotopes	8347.78 dpm/mL			

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-172456-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
1	N001-SS001-1224-01	Mercury	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
	N001-SS001-1224-01	Isotopic Thorium	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
	N001-SS001-1224-01	Isotopic Uranium	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
	N001-SS001-1224-01	Gamma Spectroscopy	Soil	8/11/2015	13:55	1	32 oz glass jar	4 C	N
	N001-SS001-1224-01	TAL Metals	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
2	N001-SS002-1224-01	TAL Metals	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Mercury	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Isotopic Thorium	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Isotopic Uranium	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Gamma Spectroscopy	Soil	8/11/2015	14:21	1	32 oz glass jar	4 C	N
3	N001-SS003-0012-01	Mercury	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
	N001-SS003-0012-01	Gamma Spectroscopy	Soil	8/11/2015	14:50	1	32 oz glass jar	4 C	N
	N001-SS003-0012-01	Isotopic Thorium	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
	N001-SS003-0012-01	TAL Metals	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
	N001-SS003-0012-01	Isotopic Uranium	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
4	N001-SS004-0012-01	TAL Metals	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N
	N001-SS004-0012-01	Mercury	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N
	N001-SS004-0012-01	Isotopic Thorium	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #			
Special Instructions: Results for Radium-226 and Radon-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248			

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples sent for analysis	Joe Petty RST3	8/13/15 1900	Joe Clark TA-SR	8-14-15 1325	



160-13352 Chair of Custody

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-172456-0001
Cooley #: 1
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N001-SS004-0012-01	Isotopic Uranium	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N
	N001-SS004-0012-01	Gamma Spectroscopy	Soil	8/11/2015	15:00	1	32 oz glass jar	4 C	N
5	N001-SS005-1830-01	Isotopic Uranium	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
	N001-SS005-1830-01	Gamma Spectroscopy	Soil	8/11/2015	15:26	1	32 oz glass jar	4 C	N
	N001-SS005-1830-01	TAL Metals	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
	N001-SS005-1830-01	Mercury	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
	N001-SS005-1830-01	Isotopic Thorium	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
L	N001-SS006-0012-01	Gamma Spectroscopy	Soil	8/12/2015	15:30	1	32 oz glass jar	4 C	N
	N001-SS006-0012-01	Isotopic Uranium	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
	N001-SS006-0012-01	Isotopic Thorium	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
	N001-SS006-0012-01	Mercury	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
	N001-SS006-0012-01	TAL Metals	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
1	N001-SS007-0012-01	Isotopic Uranium	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	Mercury	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	Isotopic Thorium	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	TAL Metals	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	Gamma Spectroscopy	Soil	8/12/2015	15:15	1	32 oz glass jar	4 C	N
8	N002-SS001-0012-01	TAL Metals	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #	
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248	

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples analyzed	Joel Petty RST3	8/13/15 1900	Jill Clarke TA ST	8/14/15 1325	

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-172456-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N002-SS001-0012-01	Gamma Spectroscopy	Soil	8/11/2015	13:10	1	32 oz glass jar	4 C	N
	N002-SS001-0012-01	Isotopic Uranium	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N
	N002-SS001-0012-01	Isotopic Thorium	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N
	N002-SS001-0012-01	Mercury	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N
1	N002-SS002-0012-01	Isotopic Uranium	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	Isotopic Thorium	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	Mercury	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	TAL Metals	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	Gamma Spectroscopy	Soil	8/11/2015	13:30	1	32 oz glass jar	4 C	N
10	N002-SS003-0012-01	Mercury	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N
	N002-SS003-0012-01	Gamma Spectroscopy	Soil	8/11/2015	16:45	1	32 oz glass jar	4 C	N
	N002-SS003-0012-01	Isotopic Thorium	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N
	N002-SS003-0012-01	TAL Metals	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N
	N002-SS003-0012-01	Isotopic Uranium	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #			
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248			
Items/Reason Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time Sample Condition Upon Receipt
<i>all samples analyzed</i>	8/13/15 19:00	<i>Joel Petty TA ST3</i>	<i>8/16/15 13:25</i>

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-180955-0002

Cooler #: 2
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
11	N002-SS004-0012-01	TAL Metals	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Mercury	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Isotopic Thorium	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Isotopic Uranium	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Gamma Spectroscopy	Soil	8/11/2015	17:00	1	32 oz glass jar	4 C	N
12	N002-SS005-0012-01	Mercury	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
	N002-SS005-0012-01	Gamma Spectroscopy	Soil	8/11/2015	15:58	1	32 oz glass jar	4 C	N
	N002-SS005-0012-01	Isotopic Thorium	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
	N002-SS005-0012-01	TAL Metals	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
	N002-SS005-0012-01	Isotopic Uranium	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
13	N002-SS006-2436-01	TAL Metals	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Mercury	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Isotopic Thorium	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Isotopic Uranium	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Gamma Spectroscopy	Soil	8/11/2015	16:25	1	32 oz glass jar	4 C	N
14	N002-TRENCH-0003-01	TAL Metals	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N
	N002-TRENCH-0003-01	Mercury	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N
	N002-TRENCH-0003-01	Isotopic Thorium	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #		
Special Instructions: Results for Radium-226 and Radon-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248		

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
sample analysis	J. M. Clark AST3	8/13/15 19:01	J. M. Clark AST3	8/14/15 08:45	1325

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-180955-0002
Cooler #: 2
Lab: TestAmerica Laboratories, Inc. - St.
Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N002-TRENCH-0003-01	Gamma Spectroscopy	Soil	8/13/2015	08:05	1	32 oz glass jar	4 C	N
	N002-TRENCH-0003-01	Isotopic Uranium	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N
13	N003-SS001-1022-01	Gamma Spectroscopy	Soil	8/11/2015	11:30	1	32 oz glass jar	4 C	N
	N003-SS001-1022-01	Mercury	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
	N003-SS001-1022-01	TAL Metals	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
	N003-SS001-1022-01	Isotopic Uranium	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
	N003-SS001-1022-01	Isotopic Thorium	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
14	N003-SS002-2436-01	Mercury	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
	N003-SS002-2436-01	Isotopic Thorium	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
	N003-SS002-2436-01	Isotopic Uranium	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
	N003-SS002-2436-01	Gamma Spectroscopy	Soil	8/11/2015	11:45	1	32 oz glass jar	4 C	N
	N003-SS002-2436-01	TAL Metals	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
15	N003-SS003-1224-01	Mercury	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
	N003-SS003-1224-01	Gamma Spectroscopy	Soil	8/11/2015	12:30	2	32 oz glass jar	4 C	Y
	N003-SS003-1224-01	Isotopic Thorium	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
	N003-SS003-1224-01	TAL Metals	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
	N003-SS003-1224-01	Isotopic Uranium	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
16	N003-SS003-1224-02	TAL Metals	Soil	8/11/2015	12:30	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #		

Special Instructions: Results for Radium-226 and Radon-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumby@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples	Joel Petty KSG3	8/13/15 10:00 AM	John Clarke TA5C	8/14/15 1325	

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9862 5955

CHAIN OF CUSTODY RECORD

Case #. 337

Contact Name: Joel Petty

AirbillNo: 8037 9662 5956

No : 2-081315-180955-0002
Lab: TestAmerica Laboratories, Inc. - St. Louis
Cooler #: 2
Lnb Dbnrno: 244 200 055

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO Q089248

SAMPLES TRANSFERRED FROM	CHAIN OF CUSTODY #
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089243	

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case # 337

Contact Name: Joel Petty

Airbill No: 8037 9662 5956

No: 2-081315-181116-0003
Lab: TestAmerica Laboratories, Inc. - St. Louis
Cooler #: 3
Lab Phone: 214 200 0566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
19	RB-N-150811	TAL Metals + Hg	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
	RB-N-150811	Isotopic Thorium and Uranium	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
	RB-N-150811	Gamma Spectroscopy	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
	RB-N-150811	Radium 226/228	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
20	RB-N-150812	TAL Metals + Hg	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N
	RB-N-150812	Isotopic Thorium and Uranium	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N
	RB-N-150812	Gamma Spectroscopy	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N
	RB-N-150812	Radium 226/228	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO D089248

SAMPLES TRANSFERRED FROM	CHAIN OF CUSTODY #
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248	

Login Sample Receipt Checklist

Client: Weston Solutions, Inc.

Job Number: 160-13352-2

Login Number: 13352

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

Job Number: 160-13352-3

Job Description: EPA RST2 - RFP No. 337

For:

Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837

Attention: Ms. Smita Sumbaly



Approved for release.
Rhonda E Ridenhower
Manager of Project Management
8/27/2015 11:14 AM

Rhonda E Ridenhower, Manager of Project Management
13715 Rider Trail North, Earth City, MO, 63045
rhonda.ridenhower@testamericainc.com
08/27/2015

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager.

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

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Definitions/Glossary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Rad TICs

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Weston Solutions, Inc.

Project: EPA RST2 - RFP No. 337

Report Number: 160-13352-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 08/14/2015; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 3.2° C, 4.5° C, 4.7° C and 5.3° C.

RADIUM 226 (NO INGROWTH)

Samples N001-SS001-1224-01 (160-13352-1), N001-SS002-1224-01 (160-13352-2), N001-SS003-0012-01 (160-13352-3), N001-SS004-0012-01 (160-13352-4), N001-SS005-1830-01 (160-13352-5), N001-SS006-0012-01 (160-13352-6), N001-SS007-0012-01 (160-13352-7), N002-SS001-0012-01 (160-13352-8), N002-SS002-0012-01 (160-13352-9), N002-SS003-0012-01 (160-13352-10), N002-SS004-0012-01 (160-13352-11), N002-SS005-0012-01 (160-13352-12), N002-SS006-2436-01 (160-13352-13), N002-TRENCH-0003-01 (160-13352-14), N003-SS001-1022-01 (160-13352-15), N003-SS002-2436-01 (160-13352-16), N003-SS003-1224-01 (160-13352-17) and N003-SS003-1224-02 (160-13352-18) were analyzed for Radium 226 (No ingrowth) in accordance with GA-01-R. The samples were leached on 08/15/2015, prepared on 08/19/2015 and analyzed on 08/22/2015 and 08/23/2015.

Prep Batch 206989:

Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. Bi-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. The laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.

The MDC was greater than the requested limit of 1 pCi/g for Radium-226. Radium-226 was requested to be reported with no ingrowth for this batch; therefore, samples were reported from the only usable gamma energy line, 185.99 KeV. This energy line has a low efficiency which causes an elevated MDC.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N001-SS001-1224-01

Lab Sample ID: 160-13352-1

Date Collected: 08/11/15 13:55

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.215		0.0852	0.0881		0.0987	pCi/g	08/19/15 12:18	08/22/15 13:56	1
Radium-226	5.25		1.62	1.86	1.00	1.56	pCi/g	08/19/15 12:18	08/22/15 13:56	1
Radium-228	1.01		0.304	0.321		0.166	pCi/g	08/19/15 12:18	08/22/15 13:56	1

Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	1.01		0.304	0.321		0.166	pCi/g	08/19/15 12:18	08/22/15 13:56	1
Bi-214	0.678		0.197	0.209		0.174	pCi/g	08/19/15 12:18	08/22/15 13:56	1
K-40	14.9		2.40	2.85		1.35	pCi/g	08/19/15 12:18	08/22/15 13:56	1
Pb-212	0.986		0.200	0.237		0.185	pCi/g	08/19/15 12:18	08/22/15 13:56	1
Pb-214	0.843		0.202	0.220		0.152	pCi/g	08/19/15 12:18	08/22/15 13:56	1
Tl-208	0.379		0.116	0.122		0.102	pCi/g	08/19/15 12:18	08/22/15 13:56	1

Client Sample ID: N001-SS002-1224-01

Lab Sample ID: 160-13352-2

Matrix: Solid

Date Collected: 08/11/15 14:21

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.196		0.0672	0.0703		0.0543	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Radium-226	1.98		1.13	1.18	1.00	1.73	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Radium-228	0.705		0.184	0.198		0.279	pCi/g	08/19/15 12:18	08/22/15 13:57	1

Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	0.705		0.184	0.198		0.279	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Bi-214	0.853		0.186	0.206		0.163	pCi/g	08/19/15 12:18	08/22/15 13:57	1
K-40	13.2		1.67	2.15		0.797	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Pb-212	0.996		0.157	0.203		0.143	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Pb-214	0.990		0.149	0.181		0.158	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Tl-208	0.357		0.0714	0.0804		0.0351	pCi/g	08/19/15 12:18	08/22/15 13:57	1

Client Sample ID: N001-SS003-0012-01

Lab Sample ID: 160-13352-3

Matrix: Solid

Date Collected: 08/11/15 14:50

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.143		0.0920	0.0932		0.136	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Radium-226	3.68		1.59	1.72	1.00	1.74	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Radium-228	0.949		0.272	0.289		0.233	pCi/g	08/19/15 12:18	08/22/15 13:57	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N001-SS003-0012-01

Date Collected: 08/11/15 14:50

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-3

Matrix: Solid

Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	0.949		0.272	0.289		0.233	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Bi-214	0.962		0.203	0.226		0.165	pCi/g	08/19/15 12:18	08/22/15 13:57	1
K-40	17.7		2.34	2.96		0.935	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Pb-212	1.02		0.201	0.240		0.192	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Pb-214	0.985		0.184	0.210		0.196	pCi/g	08/19/15 12:18	08/22/15 13:57	1
Tl-208	0.435		0.101	0.111		0.0814	pCi/g	08/19/15 12:18	08/22/15 13:57	1

Client Sample ID: N001-SS004-0012-01

Date Collected: 08/11/15 15:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-4

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0528	U	0.0938	0.0939		0.158	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Radium-226	3.30		2.19	2.26	1.00	2.54	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Radium-228	1.25		0.347	0.370		0.300	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	1.25		0.347	0.370		0.300	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Bi-214	0.869		0.215	0.233		0.198	pCi/g	08/19/15 12:18	08/22/15 14:42	1
K-40	20.4		2.48	3.25		1.28	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Pb-212	1.02		0.182	0.225		0.168	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Pb-214	1.08		0.213	0.241		0.184	pCi/g	08/19/15 12:18	08/22/15 14:42	1
Tl-208	0.491		0.116	0.127		0.0913	pCi/g	08/19/15 12:18	08/22/15 14:42	1

Client Sample ID: N001-SS005-1830-01

Date Collected: 08/11/15 15:26

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-5

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.137		0.0766	0.0779		0.101	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Radium-226	3.88		2.11	2.21	1.00	2.56	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Radium-228	1.28		0.389	0.411		0.260	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	1.28		0.389	0.411		0.260	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Bi-214	1.37		0.264	0.300		0.195	pCi/g	08/19/15 12:18	08/22/15 14:43	1
K-40	15.6		2.63	3.08		1.48	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Pb-212	1.65		0.237	0.319		0.206	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Pb-214	1.76		0.252	0.311		0.237	pCi/g	08/19/15 12:18	08/22/15 14:43	1
Tl-208	0.501		0.136	0.146		0.115	pCi/g	08/19/15 12:18	08/22/15 14:43	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N001-SS006-0012-01

Date Collected: 08/12/15 15:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-6

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.277		0.120	0.124		0.131	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Radium-226	11.7		3.87	4.38	1.00	4.26	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Radium-228	11.5		0.746	1.39		0.425	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Other Detected			Count	Total						
Radionuclides			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	11.5		0.746	1.39		0.425	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Bi-212	13.3		2.03	2.45		1.67	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Bi-214	4.07		0.381	0.569		0.245	pCi/g	08/19/15 12:18	08/22/15 14:46	1
K-40	13.5		1.92	2.36		1.01	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Pb-212	12.4		0.550	1.70		0.425	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Pb-214	4.60		0.466	0.668		0.378	pCi/g	08/19/15 12:18	08/22/15 14:46	1
Tl-208	4.39		0.303	0.547		0.188	pCi/g	08/19/15 12:18	08/22/15 14:46	1

Client Sample ID: N001-SS007-0012-01

Date Collected: 08/12/15 15:15

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-7

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0433	U	0.0621	0.0623		0.103	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Radium-226	3.32		1.70	1.80	1.00	2.03	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Radium-228	0.760		0.209	0.223		0.106	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Other Detected			Count	Total						
Radionuclides			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	0.760		0.209	0.223		0.106	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Bi-214	1.11		0.198	0.229		0.155	pCi/g	08/19/15 12:18	08/22/15 15:15	1
K-40	13.9		1.80	2.29		0.991	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Pb-212	0.831		0.167	0.199		0.168	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Pb-214	1.42		0.215	0.261		0.172	pCi/g	08/19/15 12:18	08/22/15 15:15	1
Tl-208	0.306		0.0828	0.0887		0.0748	pCi/g	08/19/15 12:18	08/22/15 15:15	1

Client Sample ID: N002-SS001-0012-01

Date Collected: 08/11/15 13:10

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-8

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0697	U	0.102	0.103		0.173	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Radium-226	9.52		2.95	3.39	1.00	3.29	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Radium-228	5.19		0.495	0.725		0.366	pCi/g	08/19/15 12:18	08/22/15 15:16	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N002-SS001-0012-01

Date Collected: 08/11/15 13:10

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-8

Matrix: Solid

Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	5.19		0.495	0.725		0.366	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Bi-212	5.81		1.71	1.81		1.54	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Bi-214	4.23		0.432	0.617		0.294	pCi/g	08/19/15 12:18	08/22/15 15:16	1
K-40	8.53		1.68	1.89		1.15	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Pb-212	5.56		0.374	0.810		0.307	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Pb-214	4.81		0.401	0.641		0.338	pCi/g	08/19/15 12:18	08/22/15 15:16	1
Tl-208	2.11		0.200	0.296		0.110	pCi/g	08/19/15 12:18	08/22/15 15:16	1

Client Sample ID: N002-SS002-0012-01

Date Collected: 08/11/15 13:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-9

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0596	U	0.143	0.143		0.244	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Radium-226	14.0		4.62	5.23	1.00	4.91	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Radium-228	13.6		0.778	1.59		0.288	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	13.6		0.778	1.59		0.288	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Bi-212	16.1		2.40	2.92		1.82	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Bi-214	4.62		0.560	0.737		0.427	pCi/g	08/19/15 12:18	08/22/15 15:18	1
K-40	15.9		2.24	2.77		1.13	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Pb-212	13.6		0.516	1.83		0.418	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Pb-214	4.58		0.467	0.667		0.476	pCi/g	08/19/15 12:18	08/22/15 15:18	1
Tl-208	5.01		0.320	0.610		0.186	pCi/g	08/19/15 12:18	08/22/15 15:18	1

Client Sample ID: N002-SS003-0012-01

Date Collected: 08/11/15 16:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-10

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	-0.00297	U	0.0507	0.0507		0.0917	pCi/g	08/19/15 12:18	08/22/15 15:19	1
Radium-226	4.27		1.83	1.98	1.00	1.75	pCi/g	08/19/15 12:18	08/22/15 15:19	1
Radium-228	1.42		0.263	0.300		0.0901	pCi/g	08/19/15 12:18	08/22/15 15:19	1
Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	1.42		0.263	0.300		0.0901	pCi/g	08/19/15 12:18	08/22/15 15:19	1
Bi-212	1.93		0.553	0.588		0.291	pCi/g	08/19/15 12:18	08/22/15 15:19	1
Bi-214	0.931		0.185	0.209		0.154	pCi/g	08/19/15 12:18	08/22/15 15:19	1
K-40	17.0		1.89	2.57		0.910	pCi/g	08/19/15 12:18	08/22/15 15:19	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N002-SS003-0012-01

Lab Sample ID: 160-13352-10

Matrix: Solid

Date Collected: 08/11/15 16:45

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
	Pb-212	1.14		0.173	0.227		0.148	pCi/g	08/19/15 12:18	08/22/15 15:19	1
	Pb-214	0.895		0.159	0.184		0.156	pCi/g	08/19/15 12:18	08/22/15 15:19	1
	Tl-208	0.462		0.0862	0.0986		0.0507	pCi/g	08/19/15 12:18	08/22/15 15:19	1

Client Sample ID: N002-SS004-0012-01

Lab Sample ID: 160-13352-11

Matrix: Solid

Date Collected: 08/11/15 17:00

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137		0.256		0.0905	0.0943		0.0666	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Radium-226		5.03		1.98	2.17	1.00	2.02	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Radium-228		1.37		0.284	0.317		0.145	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228		1.37		0.284	0.317		0.145	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Bi-212		2.29		0.948	0.978		0.782	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Bi-214		0.933		0.235	0.254		0.205	pCi/g	08/19/15 12:18	08/22/15 15:20	1
K-40		19.3		2.46	3.15		0.954	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Pb-212		1.12		0.228	0.271		0.218	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Pb-214		0.945		0.201	0.224		0.213	pCi/g	08/19/15 12:18	08/22/15 15:20	1
Tl-208		0.398		0.111	0.118		0.0970	pCi/g	08/19/15 12:18	08/22/15 15:20	1

Client Sample ID: N002-SS005-0012-01

Lab Sample ID: 160-13352-12

Matrix: Solid

Date Collected: 08/11/15 15:58

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137		0.0153	U	0.0735	0.0735		0.133	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Radium-226		3.20		2.46	2.52	1.00	2.92	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Radium-228		0.723		0.285	0.294		0.456	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228		0.723		0.285	0.294		0.456	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Bi-214		0.962		0.245	0.265		0.244	pCi/g	08/19/15 12:18	08/22/15 15:52	1
K-40		15.6		2.54	3.00		2.10	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Pb-212		1.08		0.219	0.260		0.214	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Pb-214		0.944		0.242	0.261		0.238	pCi/g	08/19/15 12:18	08/22/15 15:52	1
Tl-208		0.407		0.118	0.125		0.111	pCi/g	08/19/15 12:18	08/22/15 15:52	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N002-SS006-2436-01

Lab Sample ID: 160-13352-13

Date Collected: 08/11/15 16:25

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	-0.0115	U	0.126	0.126		0.129	pCi/g	08/19/15 12:18	08/22/15 15:53	1
Radium-226	1.58	U	1.22	1.25	1.00	2.00	pCi/g	08/19/15 12:18	08/22/15 15:53	1
Radium-228	1.00		0.302	0.319		0.168	pCi/g	08/19/15 12:18	08/22/15 15:53	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	1.00		0.302	0.319		0.168	pCi/g	08/19/15 12:18	08/22/15 15:53	1
Bi-214	0.632		0.204	0.214		0.201	pCi/g	08/19/15 12:18	08/22/15 15:53	1
K-40	12.9		2.23	2.59		1.17	pCi/g	08/19/15 12:18	08/22/15 15:53	1
Pb-212	0.905		0.185	0.219		0.173	pCi/g	08/19/15 12:18	08/22/15 15:53	1
Pb-214	0.710		0.187	0.201		0.200	pCi/g	08/19/15 12:18	08/22/15 15:53	1
Tl-208	0.313		0.0896	0.0953		0.0555	pCi/g	08/19/15 12:18	08/22/15 15:53	1

Client Sample ID: N002-TRENCH-0003-01

Lab Sample ID: 160-13352-14

Date Collected: 08/13/15 08:05

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0118	U	0.0348	0.0349		0.0628	pCi/g	08/19/15 12:18	08/23/15 19:12	1
Radium-226	0.0777	U	0.557	0.557	1.00	1.00	pCi/g	08/19/15 12:18	08/23/15 19:12	1
Radium-228	0.150	U	0.125	0.126		0.226	pCi/g	08/19/15 12:18	08/23/15 19:12	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
K-40	0.893	U	0.601	0.608		0.975	pCi/g	08/19/15 12:18	08/23/15 19:12	1
Pb-212	0.161		0.0592	0.0627		0.0584	pCi/g	08/19/15 12:18	08/23/15 19:12	1
Pb-214	0.292		0.0952	0.0999		0.0757	pCi/g	08/19/15 12:18	08/23/15 19:12	1
Tl-208	0.0593		0.0335	0.0341		0.0400	pCi/g	08/19/15 12:18	08/23/15 19:12	1

Client Sample ID: N003-SS001-1022-01

Lab Sample ID: 160-13352-15

Date Collected: 08/11/15 11:30

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	-0.00678	U	0.0355	0.0355		0.0633	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Radium-226	2.86		1.07	1.18	1.00	1.00	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Radium-228	0.358		0.113	0.119		0.169	pCi/g	08/19/15 12:18	08/22/15 15:56	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	0.358		0.113	0.119		0.169	pCi/g	08/19/15 12:18	08/22/15 15:56	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N003-SS001-1022-01

Lab Sample ID: 160-13352-15

Matrix: Solid

Date Collected: 08/11/15 11:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bi-212	1.05		0.437	0.450		0.333	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Bi-214	0.765		0.129	0.152		0.0989	pCi/g	08/19/15 12:18	08/22/15 15:56	1
K-40	3.55		0.775	0.856		0.723	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Pb-212	0.462		0.111	0.126		0.105	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Pb-214	0.667		0.120	0.139		0.0913	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Tl-208	0.245		0.0565	0.0619		0.0372	pCi/g	08/19/15 12:18	08/22/15 15:56	1

Client Sample ID: N003-SS002-2436-01

Lab Sample ID: 160-13352-16

Matrix: Solid

Date Collected: 08/11/15 11:45

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0193	U	0.0430	0.0430		0.0751	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Radium-226	3.06		1.46	1.55	1.00	1.59	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Radium-228	0.839		0.179	0.198		0.163	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	0.839		0.179	0.198		0.163	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Bi-212	1.41		0.498	0.520		0.325	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Bi-214	0.589		0.167	0.178		0.164	pCi/g	08/19/15 12:18	08/22/15 15:56	1
K-40	14.8		1.78	2.34		0.657	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Pb-212	0.623		0.129	0.152		0.132	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Pb-214	0.734		0.152	0.170		0.176	pCi/g	08/19/15 12:18	08/22/15 15:56	1
Tl-208	0.261		0.0676	0.0728		0.0572	pCi/g	08/19/15 12:18	08/22/15 15:56	1

Client Sample ID: N003-SS003-1224-01

Lab Sample ID: 160-13352-17

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Cesium-137	0.0585	U	0.0654	0.0657		0.106	pCi/g	08/19/15 12:18	08/22/15 16:28	1
Radium-226	3.19		1.71	1.80	1.00	2.12	pCi/g	08/19/15 12:18	08/22/15 16:28	1
Radium-228	2.42		0.395	0.466		0.170	pCi/g	08/19/15 12:18	08/22/15 16:28	1
Other Detected Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Ac-228	2.42		0.395	0.466		0.170	pCi/g	08/19/15 12:18	08/22/15 16:28	1
Bi-212	3.15		1.33	1.37		1.13	pCi/g	08/19/15 12:18	08/22/15 16:28	1
Bi-214	1.32		0.229	0.267		0.183	pCi/g	08/19/15 12:18	08/22/15 16:28	1
K-40	11.1		1.71	2.05		1.15	pCi/g	08/19/15 12:18	08/22/15 16:28	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N003-SS003-1224-01

Lab Sample ID: 160-13352-17

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
	Pb-212	2.10		0.251	0.370		0.230	pCi/g	08/19/15 12:18	08/22/15 16:28	1
	Pb-214	1.32		0.258	0.292		0.210	pCi/g	08/19/15 12:18	08/22/15 16:28	1
	Tl-208	0.822		0.115	0.143		0.0601	pCi/g	08/19/15 12:18	08/22/15 16:28	1

Client Sample ID: N003-SS003-1224-02

Lab Sample ID: 160-13352-18

Matrix: Solid

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
			Uncert.	(2σ+/-)							
Cesium-137	0.0733	U	0.0662	0.0666		0.101	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Radium-226	4.87		2.23	2.39	1.00	2.47	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Radium-228	2.17		0.422	0.476		0.247	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
Ac-228	2.17		0.422	0.476		0.247	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Bi-212	2.69		0.933	0.974		0.670	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Bi-214	1.13		0.262	0.287		0.210	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
K-40	8.09		1.88	2.05		1.78	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Pb-212	2.20		0.247	0.377		0.196	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Pb-214	1.06		0.216	0.243		0.190	pCi/g	08/19/15 12:18	08/22/15 16:28	1	
Tl-208	0.804		0.158	0.178		0.114	pCi/g	08/19/15 12:18	08/22/15 16:28	1	

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-206989/1-A

Matrix: Solid

Analysis Batch: 207147

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 206989

Analyte	Result	MB	MB	Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	Total						
Cesium-137	0.0000	U		0.00805		0.00805			0.0603	pCi/g	08/19/15 12:18	08/22/15 13:52	1
Radium-226	-0.3606	U		1.44		1.44		1.00	1.22	pCi/g	08/19/15 12:18	08/22/15 13:52	1
Radium-228	0.03597	U		0.0802		0.0803			0.279	pCi/g	08/19/15 12:18	08/22/15 13:52	1
<i>Other Detected Radionuclides</i>				<i>MB</i>	<i>MB</i>	<i>Uncert.</i>	<i>Uncert.</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected Radionuclide	None										<i>pCi/g</i>	<i>08/19/15 12:18</i>	<i>08/22/15 13:52</i>

Lab Sample ID: LCS 160-206989/2-A

Matrix: Solid

Analysis Batch: 207148

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 206989

Analyte	Spike Added	LCS Result	LCS Qual	Total		RL	MDC	Unit	%Rec	Limits
				Uncert. (2σ+/-)	Total					
Americium-241	97.3	101.2		10.7			1.29	pCi/g	104	87 - 116
Cesium-137	30.2	30.01		3.25			0.419	pCi/g	99	87 - 120
Cobalt-60	19.0	18.85		1.97			0.0729	pCi/g	99	87 - 115

Lab Sample ID: 160-13352-1 DU

Matrix: Solid

Analysis Batch: 207152

Client Sample ID: N001-SS001-1224-01

Prep Type: Total/NA

Prep Batch: 206989

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total		RL	MDC	Unit	RER	Limit
					Uncert. (2σ+/-)	Total					
Cesium-137	0.215		0.1289		0.0663			0.0652	pCi/g	0.56	1
Radium-226	5.25		2.380		1.24		1.00	1.37	pCi/g	0.92	1
Radium-228	1.01		1.100		0.270			0.108	pCi/g	0.16	1
<i>Other Detected Radionuclides</i>				<i>DU</i>	<i>DU</i>	<i>Uncert.</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>RER</i>	<i>Limit</i>
Ac-228	1.01		1.100		0.270						
Bi-214	0.678		0.8408		0.194			0.142	pCi/g	0.40	1
K-40	14.9		15.99		2.63			1.12	pCi/g	0.20	1
Pb-212	0.986		0.9138		0.211			0.158	pCi/g	0.16	1
Pb-214	0.843		0.9268		0.181			0.144	pCi/g	0.21	1
Tl-208	0.379		0.3024		0.0862			0.0560	pCi/g	0.37	1

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.

TestAmerica Job ID: 160-13352-3

Project/Site: EPA RST2 - RFP No. 337

Rad

Leach Batch: 205721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-1	N001-SS001-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-1 DU	N001-SS001-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-2	N001-SS002-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-3	N001-SS003-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-4	N001-SS004-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-5	N001-SS005-1830-01	Total/NA	Solid	Dry and Grind	
160-13352-6	N001-SS006-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-7	N001-SS007-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-8	N002-SS001-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-9	N002-SS002-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-10	N002-SS003-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-11	N002-SS004-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-12	N002-SS005-0012-01	Total/NA	Solid	Dry and Grind	
160-13352-13	N002-SS006-2436-01	Total/NA	Solid	Dry and Grind	
160-13352-14	N002-TRENCH-0003-01	Total/NA	Solid	Dry and Grind	
160-13352-15	N003-SS001-1022-01	Total/NA	Solid	Dry and Grind	
160-13352-16	N003-SS002-2436-01	Total/NA	Solid	Dry and Grind	
160-13352-17	N003-SS003-1224-01	Total/NA	Solid	Dry and Grind	
160-13352-18	N003-SS003-1224-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 205721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13352-1	N001-SS001-1224-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-1 DU	N001-SS001-1224-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-2	N001-SS002-1224-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-3	N001-SS003-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-4	N001-SS004-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-5	N001-SS005-1830-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-6	N001-SS006-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-7	N001-SS007-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-8	N002-SS001-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-9	N002-SS002-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-10	N002-SS003-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-11	N002-SS004-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-12	N002-SS005-0012-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-13	N002-SS006-2436-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-14	N002-TRENCH-0003-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-15	N003-SS001-1022-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-16	N003-SS002-2436-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-17	N003-SS003-1224-01	Total/NA	Solid	Fill_Geo-0	205721
160-13352-18	N003-SS003-1224-02	Total/NA	Solid	Fill_Geo-0	205721
LCS 160-206989/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-206989/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N001-SS001-1224-01

Date Collected: 08/11/15 13:55

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207150	08/22/15 13:56	ALS	TAL SL

Client Sample ID: N001-SS002-1224-01

Date Collected: 08/11/15 14:21

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207152	08/22/15 13:57	RTM	TAL SL

Client Sample ID: N001-SS003-0012-01

Date Collected: 08/11/15 14:50

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207151	08/22/15 13:57	RTM	TAL SL

Client Sample ID: N001-SS004-0012-01

Date Collected: 08/11/15 15:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207147	08/22/15 14:42	RTM	TAL SL

Client Sample ID: N001-SS005-1830-01

Date Collected: 08/11/15 15:26

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207148	08/22/15 14:43	RTM	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N001-SS006-0012-01

Date Collected: 08/12/15 15:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207151	08/22/15 14:46	RTM	TAL SL

Client Sample ID: N001-SS007-0012-01

Date Collected: 08/12/15 15:15

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207147	08/22/15 15:15	RTM	TAL SL

Client Sample ID: N002-SS001-0012-01

Date Collected: 08/11/15 13:10

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207148	08/22/15 15:16	RTM	TAL SL

Client Sample ID: N002-SS002-0012-01

Date Collected: 08/11/15 13:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207150	08/22/15 15:18	ALS	TAL SL

Client Sample ID: N002-SS003-0012-01

Date Collected: 08/11/15 16:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207152	08/22/15 15:19	RTM	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N002-SS004-0012-01

Lab Sample ID: 160-13352-11

Matrix: Solid

Date Collected: 08/11/15 17:00

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207151	08/22/15 15:20	RTM	TAL SL

Client Sample ID: N002-SS005-0012-01

Lab Sample ID: 160-13352-12

Matrix: Solid

Date Collected: 08/11/15 15:58

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207147	08/22/15 15:52	RTM	TAL SL

Client Sample ID: N002-SS006-2436-01

Lab Sample ID: 160-13352-13

Matrix: Solid

Date Collected: 08/11/15 16:25

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207148	08/22/15 15:53	RTM	TAL SL

Client Sample ID: N002-TRENCH-0003-01

Lab Sample ID: 160-13352-14

Matrix: Solid

Date Collected: 08/13/15 08:05

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207167	08/23/15 19:12	RTM	TAL SL

Client Sample ID: N003-SS001-1022-01

Lab Sample ID: 160-13352-15

Matrix: Solid

Date Collected: 08/11/15 11:30

Date Received: 08/14/15 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207152	08/22/15 15:56	RTM	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Client Sample ID: N003-SS002-2436-01

Date Collected: 08/11/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-16

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207151	08/22/15 15:56	RTM	TAL SL

Client Sample ID: N003-SS003-1224-01

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-17

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207147	08/22/15 16:28	RTM	TAL SL

Client Sample ID: N003-SS003-1224-02

Date Collected: 08/11/15 12:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13352-18

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:14	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207148	08/22/15 16:28	RTM	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Laboratory: TestAmerica St. Louis

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Louisiana	NELAP	6	04080	06-30-16
New Jersey	NELAP	2	MO002	09-30-15

Method Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 337

TestAmerica Job ID: 160-13352-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13352-1	N001-SS001-1224-01	Solid	08/11/15 13:55	08/14/15 13:25
160-13352-2	N001-SS002-1224-01	Solid	08/11/15 14:21	08/14/15 13:25
160-13352-3	N001-SS003-0012-01	Solid	08/11/15 14:50	08/14/15 13:25
160-13352-4	N001-SS004-0012-01	Solid	08/11/15 15:00	08/14/15 13:25
160-13352-5	N001-SS005-1830-01	Solid	08/11/15 15:26	08/14/15 13:25
160-13352-6	N001-SS006-0012-01	Solid	08/12/15 15:30	08/14/15 13:25
160-13352-7	N001-SS007-0012-01	Solid	08/12/15 15:15	08/14/15 13:25
160-13352-8	N002-SS001-0012-01	Solid	08/11/15 13:10	08/14/15 13:25
160-13352-9	N002-SS002-0012-01	Solid	08/11/15 13:30	08/14/15 13:25
160-13352-10	N002-SS003-0012-01	Solid	08/11/15 16:45	08/14/15 13:25
160-13352-11	N002-SS004-0012-01	Solid	08/11/15 17:00	08/14/15 13:25
160-13352-12	N002-SS005-0012-01	Solid	08/11/15 15:58	08/14/15 13:25
160-13352-13	N002-SS006-2436-01	Solid	08/11/15 16:25	08/14/15 13:25
160-13352-14	N002-TRENCH-0003-01	Solid	08/13/15 08:05	08/14/15 13:25
160-13352-15	N003-SS001-1022-01	Solid	08/11/15 11:30	08/14/15 13:25
160-13352-16	N003-SS002-2436-01	Solid	08/11/15 11:45	08/14/15 13:25
160-13352-17	N003-SS003-1224-01	Solid	08/11/15 12:30	08/14/15 13:25
160-13352-18	N003-SS003-1224-02	Solid	08/11/15 12:30	08/14/15 13:25

TestAmerica St. Louis

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis

Job No.: 160-13352-3

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 g	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-172456-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
1	N001-SS001-1224-01	Mercury	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
	N001-SS001-1224-01	Isotopic Thorium	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
	N001-SS001-1224-01	Isotopic Uranium	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
	N001-SS001-1224-01	Gamma Spectroscopy	Soil	8/11/2015	13:55	1	32 oz glass jar	4 C	N
	N001-SS001-1224-01	TAL Metals	Soil	8/11/2015	13:55	1	2 oz glass jar	4 C	N
2	N001-SS002-1224-01	TAL Metals	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Mercury	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Isotopic Thorium	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Isotopic Uranium	Soil	8/11/2015	14:21	1	2 oz glass jar	4 C	N
	N001-SS002-1224-01	Gamma Spectroscopy	Soil	8/11/2015	14:21	1	32 oz glass jar	4 C	N
3	N001-SS003-0012-01	Mercury	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
	N001-SS003-0012-01	Gamma Spectroscopy	Soil	8/11/2015	14:50	1	32 oz glass jar	4 C	N
	N001-SS003-0012-01	Isotopic Thorium	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
	N001-SS003-0012-01	TAL Metals	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
	N001-SS003-0012-01	Isotopic Uranium	Soil	8/11/2015	14:50	1	2 oz glass jar	4 C	N
4	N001-SS004-0012-01	TAL Metals	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N
	N001-SS004-0012-01	Mercury	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N
	N001-SS004-0012-01	Isotopic Thorium	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #			
Special Instructions: Results for Radium-226 and Radon-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248			

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples sent for analysis	Joe Petty RST3	8/13/15 1900	Joe Clark TA-SR	8-14-15 1325	



160-13352 Chair of Custody

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-172456-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N001-SS004-0012-01	Isotopic Uranium	Soil	8/11/2015	15:00	1	2 oz glass jar	4 C	N
	N001-SS004-0012-01	Gamma Spectroscopy	Soil	8/11/2015	15:00	1	32 oz glass jar	4 C	N
5	N001-SS005-1830-01	Isotopic Uranium	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
	N001-SS005-1830-01	Gamma Spectroscopy	Soil	8/11/2015	15:26	1	32 oz glass jar	4 C	N
	N001-SS005-1830-01	TAL Metals	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
	N001-SS005-1830-01	Mercury	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
	N001-SS005-1830-01	Isotopic Thorium	Soil	8/11/2015	15:26	1	2 oz glass jar	4 C	N
L	N001-SS006-0012-01	Gamma Spectroscopy	Soil	8/12/2015	15:30	1	32 oz glass jar	4 C	N
	N001-SS006-0012-01	Isotopic Uranium	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
	N001-SS006-0012-01	Isotopic Thorium	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
	N001-SS006-0012-01	Mercury	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
	N001-SS006-0012-01	TAL Metals	Soil	8/12/2015	15:30	1	2 oz glass jar	4 C	N
1	N001-SS007-0012-01	Isotopic Uranium	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	Mercury	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	Isotopic Thorium	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	TAL Metals	Soil	8/12/2015	15:15	1	2 oz glass jar	4 C	N
	N001-SS007-0012-01	Gamma Spectroscopy	Soil	8/12/2015	15:15	1	32 oz glass jar	4 C	N
8	N002-SS001-0012-01	TAL Metals	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #	
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248	

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples analyzed	Joel Petty RST3	8/13/15 1900	Jill Clarke TA ST	8/14/15 1325	

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty

Contact Phone: 732-570-4943

No: 2-081315-172456-0001
 Cooler #: 1
 Lab: TestAmerica Laboratories, Inc. - St. Louis
 Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N002-SS001-0012-01	Gamma Spectroscopy	Soil	8/11/2015	13:10	1	32 oz glass jar	4 C	N
	N002-SS001-0012-01	Isotopic Uranium	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N
	N002-SS001-0012-01	Isotopic Thorium	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N
	N002-SS001-0012-01	Mercury	Soil	8/11/2015	13:10	1	2 oz glass jar	4 C	N
1	N002-SS002-0012-01	Isotopic Uranium	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	Isotopic Thorium	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	Mercury	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	TAL Metals	Soil	8/11/2015	13:30	1	2 oz glass jar	4 C	N
	N002-SS002-0012-01	Gamma Spectroscopy	Soil	8/11/2015	13:30	1	32 oz glass jar	4 C	N
10	N002-SS003-0012-01	Mercury	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N
	N002-SS003-0012-01	Gamma Spectroscopy	Soil	8/11/2015	16:45	1	32 oz glass jar	4 C	N
	N002-SS003-0012-01	Isotopic Thorium	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N
	N002-SS003-0012-01	TAL Metals	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N
	N002-SS003-0012-01	Isotopic Uranium	Soil	8/11/2015	16:45	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM			
CHAIN OF CUSTODY #			
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248			
Items/Reason Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time Sample Condition Upon Receipt
<i>all samples analyzed</i>	<i>8/13/15 1900</i>	<i>Joel Petty TA ST3</i>	<i>8/16/15 1325</i>

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-180955-0002

Cooler #: 2
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
11	N002-SS004-0012-01	TAL Metals	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Mercury	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Isotopic Thorium	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Isotopic Uranium	Soil	8/11/2015	17:00	1	2 oz glass jar	4 C	N
	N002-SS004-0012-01	Gamma Spectroscopy	Soil	8/11/2015	17:00	1	32 oz glass jar	4 C	N
12	N002-SS005-0012-01	Mercury	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
	N002-SS005-0012-01	Gamma Spectroscopy	Soil	8/11/2015	15:58	1	32 oz glass jar	4 C	N
	N002-SS005-0012-01	Isotopic Thorium	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
	N002-SS005-0012-01	TAL Metals	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
	N002-SS005-0012-01	Isotopic Uranium	Soil	8/11/2015	15:58	1	2 oz glass jar	4 C	N
13	N002-SS006-2436-01	TAL Metals	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Mercury	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Isotopic Thorium	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Isotopic Uranium	Soil	8/11/2015	16:25	1	2 oz glass jar	4 C	N
	N002-SS006-2436-01	Gamma Spectroscopy	Soil	8/11/2015	16:25	1	32 oz glass jar	4 C	N
14	N002-TRENCH-0003-01	TAL Metals	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N
	N002-TRENCH-0003-01	Mercury	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N
	N002-TRENCH-0003-01	Isotopic Thorium	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #		
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248		

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
sample analysis	J. M. Clark AST3	8/13/15 19:01	J. M. Clark AST3	8/14/15 08:45	1325

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-180955-0002
Cooler #: 2
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N002-TRENCH-0003-01	Gamma Spectroscopy	Soil	8/13/2015	08:05	1	32 oz glass jar	4 C	N
	N002-TRENCH-0003-01	Isotopic Uranium	Soil	8/13/2015	08:05	1	2 oz glass jar	4 C	N
13	N003-SS001-1022-01	Gamma Spectroscopy	Soil	8/11/2015	11:30	1	32 oz glass jar	4 C	N
	N003-SS001-1022-01	Mercury	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
	N003-SS001-1022-01	TAL Metals	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
	N003-SS001-1022-01	Isotopic Uranium	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
	N003-SS001-1022-01	Isotopic Thorium	Soil	8/11/2015	11:30	1	2 oz glass jar	4 C	N
14	N003-SS002-2436-01	Mercury	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
	N003-SS002-2436-01	Isotopic Thorium	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
	N003-SS002-2436-01	Isotopic Uranium	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
	N003-SS002-2436-01	Gamma Spectroscopy	Soil	8/11/2015	11:45	1	32 oz glass jar	4 C	N
	N003-SS002-2436-01	TAL Metals	Soil	8/11/2015	11:45	1	2 oz glass jar	4 C	N
15	N003-SS003-1224-01	Mercury	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
	N003-SS003-1224-01	Gamma Spectroscopy	Soil	8/11/2015	12:30	2	32 oz glass jar	4 C	Y
	N003-SS003-1224-01	Isotopic Thorium	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
	N003-SS003-1224-01	TAL Metals	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
	N003-SS003-1224-01	Isotopic Uranium	Soil	8/11/2015	12:30	2	2 oz glass jar	4 C	Y
16	N003-SS003-1224-02	TAL Metals	Soil	8/11/2015	12:30	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #		

Special Instructions: Results for Radium-226 and Radon-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumby@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248

Item/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples	Joel Petty KSG3	8/13/15 10:00 AM	John Clarke TAFC	8/14/15 1325	

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9862 5955

CHAIN OF CUSTODY RECORD

Case #: 337

Contact Name: Joel Petty

AirbillNo: 8037 9662 5956

No : 2-081315-180955-0002
Lab: TestAmerica Laboratories, Inc. - St. Louis
Cooler #: 2
Lnb Dbnrno: 244 200 055

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	N003-SS003-1224-02	Mercury	Soil	8/11/2015	12:30	1	2 oz glass jar	4 C	N
	N003-SS003-1224-02	Isotopic Thorium	Soil	8/11/2015	12:30	1	2 oz glass jar	4 C	N
	N003-SS003-1224-02	Isotopic Uranium	Soil	8/11/2015	12:30	1	2 oz glass jar	4 C	N
	N003-SS003-1224-02	Gamma Spectroscopy	Soil	8/11/2015	12:30	1	32 oz glass jar	4 C	N

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
example information	Mr. Moty RST3	8/13/15 1900	Jill Clark TA SR	8/14/15 1325	

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx
Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case # 337

Contact Name: Joel Petty

AirbillNo: 8037 9662 5956

No: 2-081315-181116-0003
Lab: TestAmerica Laboratories, Inc. - St. Louis
Cooler #: 3
Lab Phone: 314 200 0566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
19	RB-N-150811	TAL Metals + Hg	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
	RB-N-150811	Isotopic Thorium and Uranium	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
	RB-N-150811	Gamma Spectroscopy	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
	RB-N-150811	Radium 226/228	DI Water	8/11/2015	19:30	1	1 L poly	HNO3 pH<2	N
20	RB-N-150812	TAL Metals + Hg	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N
	RB-N-150812	Isotopic Thorium and Uranium	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N
	RB-N-150812	Gamma Spectroscopy	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N
	RB-N-150812	Radium 226/228	DI Water	8/12/2015	15:45	1	1 L poly	HNO3 pH<2	N

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to ssumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248

SAMPLES TRANSFERRED FROM	CHAIN OF CUSTODY #
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 337, PO 0089248	

Login Sample Receipt Checklist

Client: Weston Solutions, Inc.

Job Number: 160-13352-3

Login Number: 13352

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	